amateur radio

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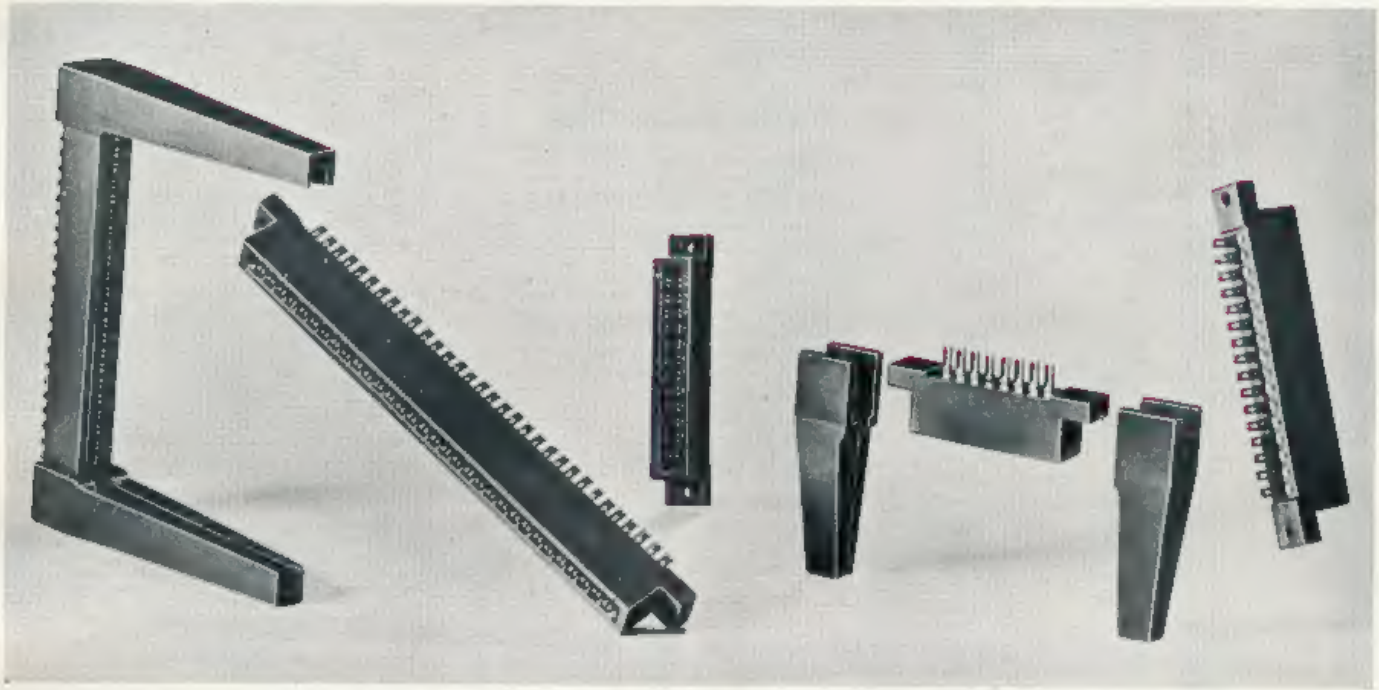

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MODEL CT330

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amateur radio

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COVER STORY

This month's cover shows some of the range of edge connectors manufactured by Painton (Aust.) Pty. Ltd. Designed for use with a 1/16" thick board, these connectors are made from a robust moulding material, dark blue in colour, and have good mechanical and electrical properties. Socket clips are gold plated with a bell shaped opening to provide reliable electrical contact.

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FEDERAL COMMENT

In this issue you will find a report on the proceedings at the Federal Convention held last Easter at Canberra. I urge you to read this report as I hope that you will be interested in the work being done by your Federal organisation. I hope that you have already read the report of the retiring Federal President, John Battrick, VK-3OR, published in the May issue of "Amateur Radio".

I draw your attention in particular to those parts of the report dealing with I.A.R.U. Region III. Organisation and the P.M.G. and regulations.

I believe that the Federal organisation of our Australian Amateur Society must be an active organisation in order to perform its vital function of protecting our hobby. At times the W.I.A. has been criticised for not providing sufficient information as to its activities. At times I am afraid that I have, on reflection, been forced to agree with some of this criticism. If you read both these reports, I believe you will find that you are well informed on those matters that are of current concern. If you find that you desire more information on any particular topic, this is available. Once the formal Minutes of the Convention are completed, enough copies will be sent to each Division to provide one copy for each Divisional Councillor. So if you want more information, do not hesitate to approach either your Divisional Federal Councillor or any member of your Divisional Council.

But where do we go from here? The Federal Council determines policy—in some areas this must be necessarily determined very broadly indeed—in other areas a more precise direction can be given. It is the task of the Federal Executive to implement the policy and to undertake the various tasks allocated to it. In some cases the Executive will in turn allocate this function to another committee. Whatever it does, and whoever does it, the Executive will report back to the next Federal Convention offering such advice as it can and receiving in turn the Federal Council's direction as to the forthcoming year. In more specific terms, the Executive is at this time giving particular attention to the manner in which the W.I.A. will celebrate the Cook bicentenary year 1970, for that year also marks the 60th year of the W.I.A., the oldest radio society in the world. I am now very hopeful that we will be able to make an important announcement about this matter in the very near future.

Michael Owen, VK3KI

Liaison with the Central Administration of the Postmaster-General's Department continues. The interim Constitution accepted by the W.I.A. as a member Society has now been sent to the other national Societies involved. The c.w. test programme is being investigated. The constitutional matters resolved at Canberra have been referred to the Institute's solicitors.

In carrying out their duties, members of the Executive are in regular communication with Federal Councillors. By medium of the Federal Councillors, the Executive can to some extent keep in touch with the views of members in all Divisions.

This year I hope to have the opportunity of visiting as many Divisions as possible. I want the Federal Executive to be aware of the widest possible cross section of the views of members. I would welcome the opportunity to tell as many members as possible what the Federal Executive is doing and why it is doing it.

As you read this, I will be in New Zealand at the current invitation of the N.Z.A.R.T., attending their Conference at Gisborne. I will be representing the W.I.A. When I return, I shall be reporting to Federal Councillors on this visit, and I will also, I hope, be able to provide some information for "Amateur Radio".

Closer co-operation between the N.Z.A.R.T. and W.I.A. seems to me to offer tremendous advantages to both Societies. I regard this visit as a most important highlight of this Institute year which has just commenced.

—MICHAEL OWEN, VK3KI,
Federal President, W.I.A.

ELECTRONIC KEYER

L. VALE, VK5NO*

ELECTRONIC keyers are used in conjunction with a contact "paddle" of similar form to that used in semi automatic or "bug" keys, except that for use with an electronic keyer the paddle makes a separate pair of contacts when pressed either to left or right of the central position. The contacts made when the key is pressed to the right cause the keyer to make a series of dots, and the left hand contact a series of dashes. In addition, the type of keyer to be described automatically makes correctly spaced dots and dashes and completes the individual dot or dash even though the paddle has not been made for the full time—a brief touch of the dot contacts will make a complete dot at the speed at which the keyer is set and if the dash contacts are made for a longer time than a dot length a complete dash is made. Therefore, all the operator needs to do to produce perfect c.w. is to start the characters off, get his hand clear of the paddle before he produces a string of perfectly spaced dashes or dots and watch the spacing between letters and words.

It is believed that the first keyer of this type was made by W9TO and used valves. Several others have been described using transistors and, lately, integrated circuits. This is the third one made and used by the writer; the first, using germanium transistors, performed well for many years; the second using silicon transistors, has been in use until the third, which uses integrated circuits, and is the simplest of the three, was put into operation.

The use of integrated circuits is of very little advantage except that in this case they are cheaper and take less room than the corresponding transistors would. The particular units used—type 914—are inexpensive and readily available. Each contains a pair of dual NOR gates, which means that each contains four transistors and a few resistors, as shown in the 914 circuit diagram, Fig. 1.

The circuit diagram of the keyer is shown in Fig. 2. G1 is used as a free running multivibrator and makes the dots; G2 is a bistable multibrator that fills in the spaces between alternate pairs of dots in order to form dashes, and G3 contains the control gates. VT1 is used as the output inverter to develop about 25 volts d.c., which is sufficient to operate the keyer tube in the writer's transmitter. Should it be desired to use relay contacts at output, a suitable circuit is shown as in Fig. 3. It must be pointed out here that the relay chosen must be fast operating—one type used successfully here is the S.T.C. type 4184GD, which is available in surplus equipment.

The method of operation of the keyer is as follows (refer to Fig. 4): When neither the dot contacts nor dash contacts are made, both G1 and G2 are held in the off position (pin 7 of G1 and pin 6 of G2 near earth potential and pin 6 of G1 and pin 7 of G2 positive) via diodes D1 and D5 respectively, by the outputs of G3, which are in turn held in the earthed condition by the presence of positive voltage (via R5 and R6) on one input of each nor gate. When the dot contacts are made, voltage is removed from one input (pin 5) of G3. As the other input (pin 3) of this gate is earthed, the output (pin 6) rises to +3.9v., removing the clamp (D1) from pin 5 of G1. The multivibrator immediately changes state so that pin 7 becomes positive for the duration of a dot, as timed by the components in the multivibrator circuit and the amount of positive voltage supplied by the speed control VR1.

If the dot contacts are broken before the completion of the dot, D2 holds pin 5 of G3 at earth until the dot is completed. If the dot contacts are made for any period of time from a touch to less than twice a dot length, one complete dot is made.

If the components in the G1 circuit are balanced, the correct dot/space ratio will result, but it will probably be found necessary to adjust this ratio by placing a higher resistor in parallel with R2 or R4 because of tolerances in the capacities of C1 and C2. Previous keyers made here have included a potentiometer to vary the dot/space ratio or "weight", but once set they are generally left untouched.

Correctly spaced dashes are formed when the dash contacts are made, in the following manner—making the dash contacts earths the free input (pin 1) of G3, removing the clamp (D5) from

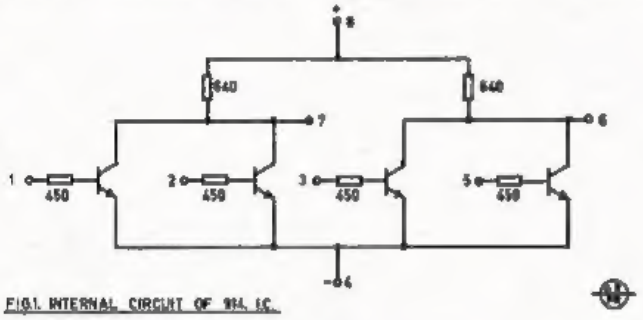


FIG.1. INTERNAL CIRCUIT OF 914 I.C.

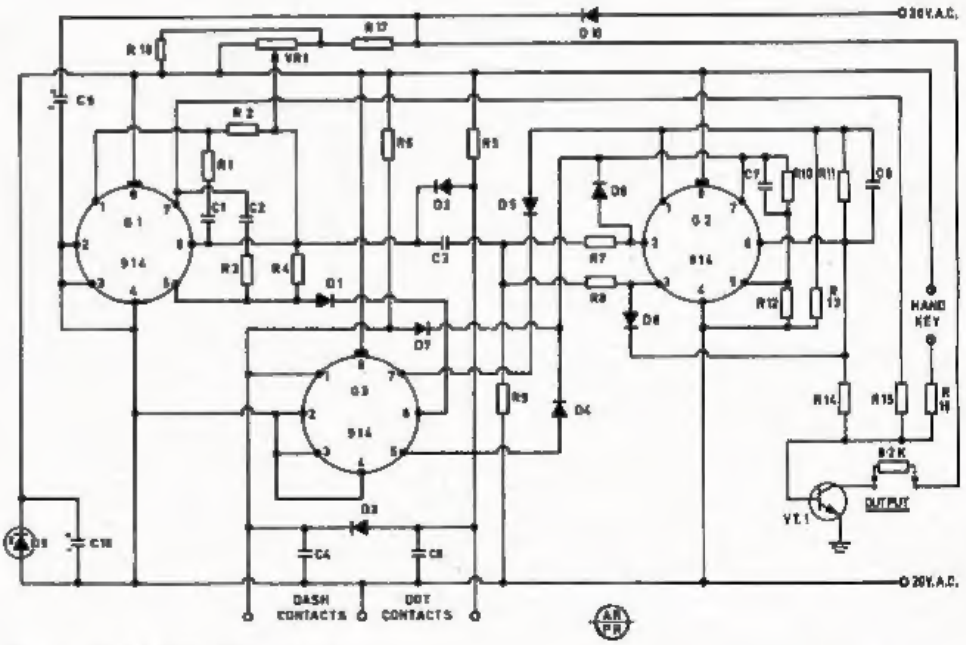


FIG. 2 CIRCUIT DIAGRAM ELECTRONIC KEYER.

C1, C2—10 uF. 16v. electrolytic.
C3—0.056 uF.
C4, C5, C7, C8—0.1 uF. 25v. ceramic.
C9—100 uF. 64v. electrolytic.
C10—100 uF. 16v. electrolytic.
D1, D2, D3, D4, D5, D6, D7, D8—Fairchild AN2001 diodes.
D9—3.9 volt Zener 1w.
D10—Rectifier diode 200 p.i.v.
G1, G2, G3—Dual 2 input Nor gate—Fairchild 914.
R1, R3—1.5K ¼w.
R2, R4, R12, R13, R14, R15, R16—10K ¼w.
R5, R9, R10, R11—2.2K ¼w.
R6—1K ¼w.
R7, R8—4.7K ¼w.
R17—470 ohm 3w.
R18—75 ohm 1w.
VR1—500 ohm.

* 29 Calton Rd., Gawler, S.A., 5118.

pin 1 of G2. At the same time D3 also effectively makes the dot contacts, forming a dot. At the finish of the dot, a pulse is sent from pin 5 of G1 via C which changes the state of G2, so that pin 6 becomes positive and pin 7 becomes earthed. The positive voltage at pin 6 is fed to the output transistor, holding the output "on", and the earth potential at pin 7 holds both the dash circuit (via D7) and the dot circuit (via D4) on until the finish of the next dot, when another pulse from G1 via C3 turns C2 back to its original "off" state. If the dash contacts are kept made, G2 continues filling in the space between alternate pairs of dots, making perfectly spaced dashes, as illustrated in Fig. 4.

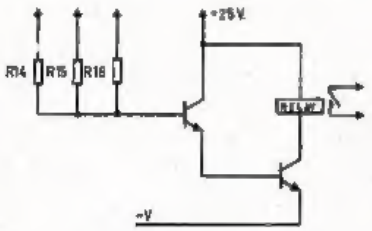


FIG.3. RELAY OUTPUT CIRCUIT.

The keyer is mounted, except for the speed control pot, on a piece of matrix board 4½" x 2½". The a.c. supply voltage is not critical and its value is dictated by the requirements of the electronic keying tube in the transmitter or the relay, whichever is used, provided that suitable adjustment is made to R17. The correct supply voltage for 914s is 3.24 to 3.96 volts, so the actual regulating voltage of D9 should be checked to see that it falls within these limits.

The paddle for the keyer is made from two small disposal Morse keys with their under-surfaces bolted together and mounted vertically, one key for dot contacts, the other for dashes. The particular keys are branded "Key W.T. 8 Amp. No. 2" on the base. The normal knobs are removed and flat pieces of bakelite are mounted in place in a similar manner to an ordinary bug key.

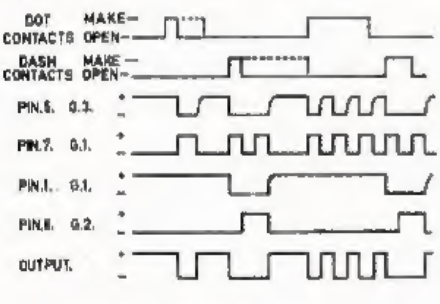


FIG. 4 WAVE FORMS ELECTRONIC KEYER.

The values shown give a speed variation from about 12 w.p.m. up. Should slower speeds be required both C1 and C2 should be changed to a higher value. Provision is made for a hand key; this has been found necessary as a means of tuning the transmitter.

No type number is given for the output transistor. The one used by the writer is an obsolete NPN silicon type 2S002. Unless the values of the a.c. supply voltage or output resistors are changed substantially, almost any NPN silicon type of sufficient voltage would do.

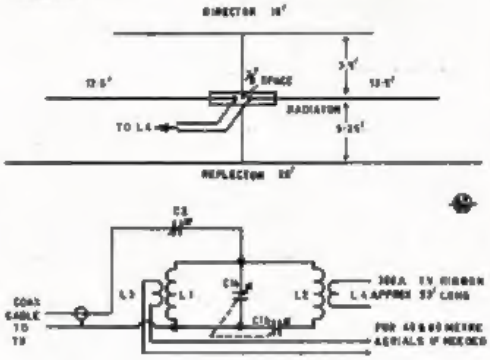
It had been intended that the discreet component circuit and the logic circuit for the keyer should be included but this was decided against because it was felt that it would make a very simple device appear more complicated.

THE ZE4JJ SPECIAL 3-ELEMENT TRI-BAND BEAM

If you are looking for a tri-band beam with super high gain, front to back ratio and enormous bandwidth compared to commercially made ones, forget about this article and buy the latter one.

However, if you are looking for an extremely simple beam which is cheap and very light, constructed in an afternoon and compares reasonably well with commercially made ones, then this might just be the one you are after.

The idea came originally from an article in a booklet called "Technical Topics" released by the R.S.G.B. Under the section of "Aerial Topics" you find a small description of the ZE4JJ Special. It states that it provides excellent results as a tri-band beam. Fed with 300 ohm ribbon, untuned, it says that it can be coupled straight into the output of a pi-network. That all sounds very simple, but I am afraid that a few more things had to be done to get it right.



Z MATCH COUPLER.

C1A, B—Good quality, standard size broadcast condenser.
C2—Single gang, broadcast condenser, 470 pF.
L1—11 turns 14 s.w.g., 2 in. diam., 2¾ in. long.
L2—5½ turns 14 s.w.g., 2 in. diam., 1¼ in. long.
L3—6 turns 14 s.w.g., 2½ in. diam., 1½ in. long.
L4—5 turns 14 s.w.g., 2½ in. diam., 1¼ in. long.

Looking at Fig. 1 you can see that the boom length is only 8 ft. 9in. The radiator measures 12 ft. 6 in. each side and not 11 ft. 6 in. as described originally by ZE4JJ. I found that problems arose as far as matching the line to the driven element is concerned on 20 metres. By making it 12 ft. 6 in., an s.w.r. of 1:1 was easily achieved after tuning the coupler. The same s.w.r. should be achieved on 15 and 10 metres.

If you want to make the beam very light you could use telescopic lengths with a diameter of ¾" and ½". However, to give the beam a firm look with little sagging, I used centre sections with a diameter of 1" with the remainder lengths made up by lengths with a diameter of ¾" and ½".

The unusual feature is that the radiator is mounted 2" above the plane of the director and reflector. I stuck to this.

The driven element is split and is insulated from the boom. Originally, I used a piece of Western Red Cedar. This is the only type of wood which is not affected by weather and is light in weight. On a more permanent model, I used aluminium channel, 2" wide and 3 ft. long. The stand-off insulators are made by Q-Max and as they are of the hard plastic variety, cracking as with porcelain ones does not occur.

Proper results are not obtained unless you use some sort of an antenna coupler. In my case I used a Z-match coupler as described in the R.S.G.B. Handbook and A.R.R.L. Antenna Handbook. The length of the 300 ohm line, which is slotted t.v. ribbon, seems critical and it would be a good idea if you start off with a length of 53 ft. A commercially made balun from 300 ohms to 75 ohms was tried. Although there were no matching problems, on air tests were very disappointing.

All on-air tests were done at a height of 17 ft. with as comparison a TH-3Jr, at a height of 27 ft. My QTH is half a mile from the beach and QSOs on 20, 15 and 10 metres were made short path to Europe. As this beam is a compromise on 20 metres, a difference of 1 to 2 S points was noted with the TH-3Jr. On 15 and 10 metres the difference varied from nothing to 1 S point. Directivity on 15 and 10 metres is excellent, but not very good on 20 metres.

It seems that one could consider this beam as a close spaced two element array, i.e. radiator-director on 10, radiator-reflector on 15, and an improved dipole on 20 metres.

Whatever it may be, it compares very well with the TH-3Jr.

Its simple construction makes it quite an attractive proposition without wasting a lot of money. At least I had a great amount of fun experimenting with it. Good luck!

—ARN VK5XV.

Al Shawsmith, VK4SS, seated at the controls.

Improving Eddystone EC-10 as a Tunable I.F. for V.H.F. Converters

T. J. FISHPOOL, VK4KE*

WHILST the Eddystone EC-10 is excellent as a general purpose receiver, it is of little use for serious work on the h.f bands, this is partly due to the poor bandspread inherent in such a receiver.

With a few simple modifications the EC-10 becomes a useful receiver to use in conjunction with v.h.f. converters. These modifications consist of fitting a co-axial socket for the input, adding a Noise Limiter, "S" meter, improving the mechanical stability of the oscillator and finally provision for reception of n.b.f.m.

CHOICE OF I.F. FOR THE V.H.F. CONVERTERS

A frequency coverage of 2 Mc. is required to cover 144-146 Mc., 432-436 Mc. and 1296-1298 Mc. It would be desirable to spread the 2 megacycles coverage over the full range of one band; this is not considered practicable and a compromise must be sought.

Band 4, 1.5-3.5 Mc. is 2 megacycles wide but such an i.f. would lead to a serious image problem to the extent of degrading the v.h.f. converter noise figure. There are two possibilities, 9-11 Mc. on Range 2 would be satisfactory for 144 Mc. converters only, but as the writer uses a 1296 Mc. converter, the i.f. adopted is 18-20 Mc. Also, the chances of i.f. breakthrough are reduced at the higher frequency.

AERIAL SOCKET

A co-axial type socket is fitted in place of the existing "A1" socket, the flange was soldered directly to chassis. To eliminate i.f. breakthrough, good quality co-ax with a tightly knit braid must be used to connect the converter to the receiver and the braid must make good connection at both ends.

OSCILLATOR STABILITY

Listening to a steady signal around 18 Mc., with the b.f.o., a gentle tap on the receiver will demonstrate the need for work around the local oscillator section. A dramatic improvement is made by shortening the oscillator collector lead. Locate the oscillator TR3 collector lead on the printed board and unsolder this lead together with the black flexible lead going to the same piece of copper. Remove this lead from switch S1j wiper. Connect TR3 collector lead directly to S1j wiper.

Further small improvements can be made by replacing the lead from the printed board to C48 oscillator section by solid wire. The "U" bracket holding the gang was earthed with solid wire to both the printed board and the adjacent side plate, also the bolt projecting through one of the vibration mount grommets is earthed the same way.

The calibration should be checked and reset if necessary as per handbook, only a small adjustment to C39 should be necessary at 29.0 Mc.

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Doubtless further minor improvements can be made but the receiver does not require to sit on sponge to copy c.w.!

"S" METER

A closed circuit 3 mm. jack socket is fitted above the earth terminal and is accessible through the existing hole in the cabinet. This jack is wired to the earthy end of R3 in the r.f. stage emitter and by-passed with a 0.01 uF. disc ceramic. A 1 mA. meter plugged into this jack reads full scale on zero signal and decreases reading with increasing signals. No attempt has been made to calibrate the meter in "S" units.

Note: The writer's receiver takes 1 mA. r.f. stage emitter current on zero signal and thus no "zero set" is required.

NOISE LIMITER

The amplitude noise limiter is shown in Fig. 1 and is of the series gate type, the diode can be any high back resistance germanium type. The components are mounted on a piece of veroboard, fitted by the r.f. gain control and held by the adjacent fixing screw for the handle. A miniature s.p.d.t. toggle switch fits 1" to the left and 5/16" below the centre line of the "phones" socket.

The limiter is quite effective in use although the audio level naturally drops with the limiter in. R34 and C74 were replaced by 10K ohms and 10 uF. to restore audio level.

F.M. DETECTOR

Increasing use is being made of n.b.f.m. on v.h.f. with the introduction of transistor p.a. stages and varactor multipliers. The writer fitted a discriminator for the purpose of receiving n.b.f.m. on 1296 Mc. from VK4ZT/P, the results compared to the usual slope detection amply justify the fitting of the discriminator. Full advantage of n.b.f.m. is not realised unless it is received with a suitable demodulator.

The circuit (Fig. 1) uses an FET i.f. amplifier and negligible loading is presented to the existing i.f. stage. The extra amplifier runs without a.g.c. to provide some limiting, also the receiver is run with a.g.c. off. The i.f.t. can be any type with tuned primary and secondary. The secondary tuning capacitor is removed and replaced by two series connected capacitors each double the value of the original capacitor. The two diodes are germanium type, e.g. OA79 or GEX34; it is very important that these diodes are accurately matched for forward resistance.

Alignment is best done with a voltmeter connected to the output, a useable deflection should be obtained on, say, the 3-volt range of a 10K ohms/volt multimeter. Tune in a strong carrier (for maximum deflection of "S" meter if fitted) and adjust the i.f.t. primary for maximum d.c. output from the discriminator. Peak up the receiver last i.f.t. for maximum d.c. output. Tune the secondary until the output polarity reverses, finally tuning for zero output. Note that slightly off tuning the carrier will give a d.c. output of polarity dependent on the direction of tuning.

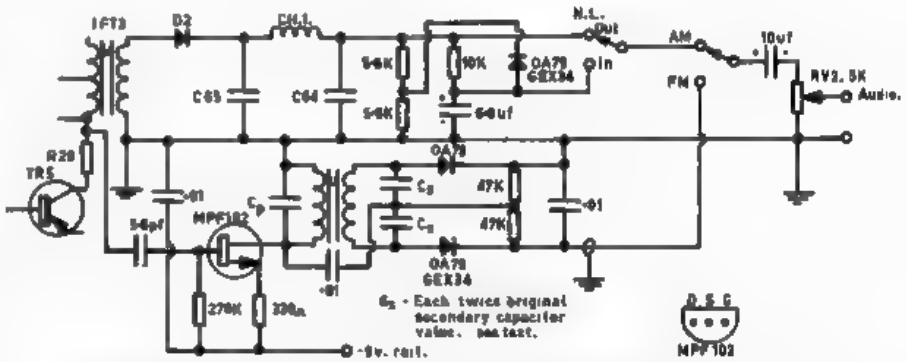

FIG. 1. CIRCUIT ALTERATIONS TO EDDYSTONE EC.10. RECEIVER, NOISE LIMITER & F.M. DETECTOR.

The writer's discriminator gives ±0.1 volt output for 465 Kc. ±10 Kc., the signal generator feeding directly to the additional i.f. stage.

The discriminator is built on a piece of tinplate 3¾" by 1¼" and is bolted to the i.f./audio assembly, beside the output transistor heat sink and parallel to the tuning scale.

The additional i.f. stage consumes 2 mA. at 9 volts and is left on. The a.m./f.m. switch fits 1" to the right and 5/16" below the "phones" socket, to match the noise limiter switch previously fitted.

The f.m. position is suitable for a transmitter deviation up to 3 Kc. It is not intended or suitable for wideband f.m.

Some of these modifications should interest EC-10 owners, however the guarantee on a new receiver would probably be invalidated by such modification.

PROJECT—SOLID STATE TRANSCEIVER

PART EIGHT

H. L. HEPBURN, VK3AFQ, and K. C. NISBET,† VK3AKK*

In this section of the article it is intended to describe the power amplifier stages in terms of practical design considerations.

Reference to the first article in the series, which appeared in the November 1968 issue of "A.R.," will show that the objective was to provide a power output of 15 watts (p.e.p.) into a 50 ohm load. In the amplifier to be described this objective has been achieved and, in practice, well in excess of 15 watts has been obtained. At a later time it may be that information will be made available to show how higher outputs can be obtained by minor modifications to component values and by specific tuning procedures.

Before describing the final form of the p.a./driver system used in the project, it is felt to be vitally necessary to cover some basic differences between valves and transistors used as power generators and what these differences mean in practice. Such a discussion should assist not only participants in the project, but also those who are thinking of going solid state in their transmitters.

TOLERANCES

A transistor is NOT tolerant to misuse like a valve.

In this statement lies the reason for the digression that will be made for a while on subjects such as impedances, component values and types, and power measurement.

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† 25 Thames Avenue, Springvale, Vic., 3171.

Carelessness apart, there are two main areas in which a transistor used as a p.a. is likely to be less tolerant than its valve counterpart. Voltage overload and heat susceptibility.

With a valve the short term application of plate voltages even double the manufacturer's rating will rarely mean its replacement. Excess plate current caused by overload, off resonance or lack of drive can be tolerated by a valve, at least for so long as it takes to reach for, and turn off, the power switch. In such cases there is usually plenty of external evidence by way of blushing anodes to trigger the operator into taking appropriate action.

This "time buffer" does not exist with transistors. It is the very first spike of excess voltage which kills the device. It is the first few watts over the rated dissipation which are the fatal ones.

However, provided that these two basic limitations are appreciated, their operating implications understood, and the appropriate safety procedures followed, then the transistor p.a. is as docile as its valve equivalent.

IMPEDANCES

In a valve used as a p.a. the plate or output impedance is given by the expression:

$$\frac{(0.8 \times \text{h.t. volts})^2}{2 \times \text{power output}}$$

Let us assume we have a valve giving 20 watts output with 500 volts on the plate and a plate current of 60 mA. (This is a class C case although this is not important here). The output impedance is thus:

$$\frac{(0.8 \times 500)^2}{2 \times 20}$$

$$= \frac{400^2}{40}$$

$$= 4{,}000 \text{ ohms.}$$

The output impedance of a transistor is given by a similar expression, viz.:

$$\frac{(\text{collector voltage})^2}{2 \times \text{power output}}$$

Again assuming a power output of 20 watts and further assuming a 13 volt supply rail, the transistor output impedance is thus:

$$\frac{13^2}{2 \times 20} = 4.2 \text{ ohms.}$$

For a similar power output then the transistor has an output impedance approximately one thousandth of the valve. The practical effect of this will now be discussed, especially as it affects matching arrangements and components.

COMPONENT VALUES

In the valve example the most usual current method (at h.f. anyway) of matching the valve to the antenna is by means of a "pi" network.

At 3.5 Mc. with a 50 ohm antenna the value of the "tuning" capacitor (C1) would be around 280 pF., the "loading" capacitor (C2) would be around 1,000 pF., while the matching inductance would be in the region of 15 microhenries.

Band mx	RFC1	C1 pF.	C2 pF.	L1	RFC2	L2	C3 pF.	C4 pF.
160	4 uH. 52 turns No. 28 B.S. on 2w. resistor	470	470	12 uH. 55 turns No. 33 B.S. F29 slug	2 uH 16 turns No. 16 B.S. ¼" I.D.	8.8 uH. 34 turns No. 16 B.S. ¾" I.D.	1000 + 20/220	4400 (2 x 2200)
80	4 uH. 52 turns No. 26 B.S. on 2w. resistor	220	220	6 uH. 45 turns No. 33 B.S. F29 slug	1 uH. 10 turns No. 16 B.S. ¼" I.D.	4.4 uH. 19 turns No. 16 B.S. ¾" I.D.	500 + 20/220	2200 + 20/220
40	2 uH. 24 turns No. 26 B.S. on 1w. resistor	100	100	3 uH. 27 turns No. 26 B.S F29 slug	0.5 uH. 14 turns No. 16 B.S. ¼" I.D.	2.2 uH. 16 turns No. 16 B.S. ¾" I.D.	220 + 20/220	1000 + 20/220
20	1 uH 20 turns No. 20 B.S. ¼" I.D.	50	50	1.5 uH. 20 turns No. 26 B.S. F29 slug	0.25 uH. 8 turns No. 16 B.S. ¼" I.D.	1.1 uH 10 turns No. 16 B.S. ¾" I.D.	100 + 20/220	425 + 20/220
15	0.75 uH. 18 turns No. 16 B.S. ¼" I.D.	33	33	1.0 uH. 16 turns No. 26 B.S. F20 slug	0.2 uH. 7 turns No. 16 B.S. ¼" I.D.	0.7 uH. 14 turns No. 16 B.S. 5/16" I.D.	47 + 20/220	330 + 20/220
10	0.5 uH. 14 turns No. 16 B.S. ¼" I.D.	22	22	0.75 uH. 12 turns No. 26 B.S. F29 slug	0.15 uH. 5 turns No. 16 B.S. ¼" I.D.	0.55 uH. 15 turns No. 16 B.S. ¾" I.D.	33 + 20/220	150 + 20/220

Table 1.—P.A. Coil and Capacitor Data.

Notes: (1) All coil inductance values are approximate only.
(2) Coils L1 are close wound on Neosid Type 722/1 bakelite formers and use an F29 slug.
(3) Coils L2 are close wound on a former of the diameter indicated and are self supporting
(4) C1 and C2 are Philips ceramic beads.
(5) The fixed parts of C3 and C4 are silver mica.

The same approach to the problem of matching the 4 ohm transistor impedance to a 50 ohm antenna leads to impossibly high values of C1, C2 and the coil. Very approximately, one would require an 0.25 uF. variable, a 1.0 uF. variable and a coil around 0.01 microhenries. Not very practical values!

In order to use components of conventional size, it is necessary to seek alternative matching arrangements.

MATCHING

It is not possible, for space reasons, to cover all the alternative matching arrangements in this article. The reader is referred to the "R.C.A. Silicon Power Circuits Manual" for a very full and useful coverage of the subject. This publication gives many types of transistor matching arrangements and for each method gives full design equations.

CURRENT FLOWS

Another point of difference between valve and transistor circuits is worthy of comment because of the effect it has on the type of component used. It is the magnitude of the r.f. currents flowing in the p.a. tank circuit.

In the valve example the d.c. current input was 60 mA. The peak d.c. current is twice this or 120 mA. The peak current flowing in the various parts of the tank circuit will approximate to the peak d.c. current times the "Q" of the circuit. If a "Q" of ten is assumed (about par for the course) then the r.f. tank currents will be around 1¼ to 1½ amps. Currents of this magnitude are satisfactorily handled by the usual coils and fixed and/or variable capacitors used.

In the transistor example the same considerations apply but the peak d.c. input is now around 3 amps. for 20 watts out. At the same "Q" of 10, the r.f. currents flowing in the tank will now be around 30 amps. It follows then that any components used, be they fixed or variable, must be capable of handling very high circulating currents. It may sound peculiar to suggest that the tank coil for a 20 watt final be wound with very heavy wire or even copper tubing, but for even passable results, let alone best results, this is what is necessary.

POWER MEASUREMENT

In view of earlier comments on the susceptibility of the transistor to both voltage and power overload, it follows that the method of absorbing and measuring power output assumes great importance.

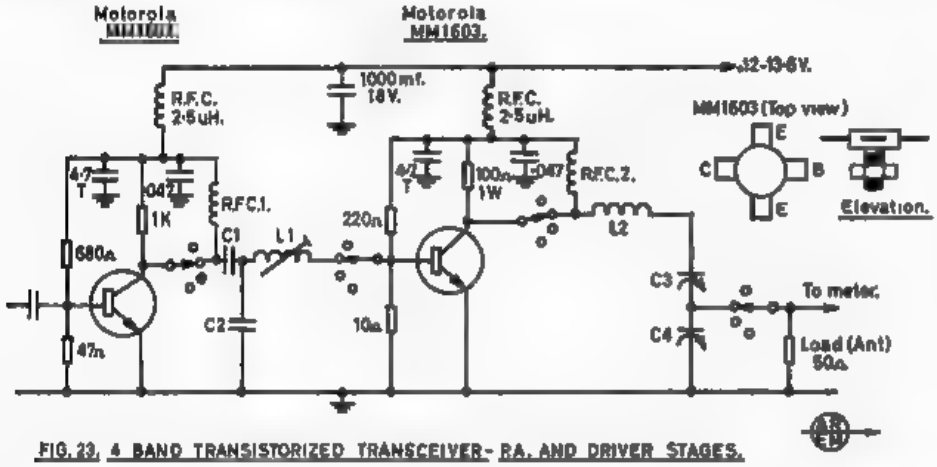


FIG. 23. 4 BAND TRANSISTORIZED TRANSCEIVER- P.A. AND DRIVER STAGES.

The text books dealing with valves in Amateur use have, for many years, recommended the domestic light bulb as a suitable load when commissioning or adjusting a valve transmitter.

A light bulb is most definitely NOT a suitable dummy load for a transistor p.a. Nor, for that matter, is an antenna of unknown impedance. In the writer's view—and experience—the only suitable dummy load is a resistive one. A resistive one moreover that is substantially non inductive at the frequency of operation. Additionally, this resistive dummy load should have an in-built means of measuring the power being absorbed by the load.

This last requirement stems from the fact that a d.c. meter in the collector circuit of the p.a. is of no real use in commissioning a transistor p.a. It is necessary as a current indicator and as a means of measuring total dissipation, but precise knowledge of **output** is necessary in order to tune up properly.

It is also necessary to clarify what the power output meter reads.

Two basic forms of power meters are in use. The first, or thermal, type of meter measures the r.f. current flowing through a fixed value of dummy load by means of a thermo-ammeter. This type of meter responds to, and is calibrated in, the r.m.s., or heating power averaged over a period of time. This type of meter is substantially independent of waveform.

The second type of meter measures the r.f. voltage appearing across the load. The voltmeter used consists basically of a rectifier diode, an integrating capacitor and a sensitive d.c. voltmeter. This type of power meter responds to the peak voltage appearing across the load and (within reason) the integrating capacitor "holds" the voltage at the peak value. The meter will indicate the peak rectified voltage **but is normally calibrated in terms of r.m.s. power.**

The distinction between the two types of meter is important when consideration is given to what one wants to measure. For reasons unimportant here, a sideband rig is rated in terms of peak envelope power or p.e.p. Note that p.e.p. refers to the r.m.s. value of power at the peak of one cycle of the modulating waveform. It is not the absolute maximum power that is reached momentarily at the extreme tip of the modulating waveform. The three sorts of power expression are given by the relationships:

Total or r.m.s. heating power ..... = P watts
Peak envelope power = 2P watts
Absolute peak power (with a sine wave) = 2.8P watts

Fig. 24 shows two waveforms. One is a c.w. signal and one is a two-tone test signal. Assume both to have the same total r.m.s. or heating power. The reaction of the two types of meter will be as follows:

(a) The thermal type of meter will read 10 watts on **both** waveforms.

(b) The diode type meter (assuming it is calibrated in r.m.s. power—the usual case) will register 10 watts on the c.w. waveform, **but 20 watts on the modulated signal.**

When using a power meter therefore it is important to know what type it is. If a thermal meter is used the reading on a two-tone test signal must be multiplied by two to give a p.e.p. reading.

If a diode type meter is used, the meter will read p.e.p. direct.

GENERAL DESIGN FEATURES

Getting (slowly to be sure!) a little nearer to the business in hand, refer-

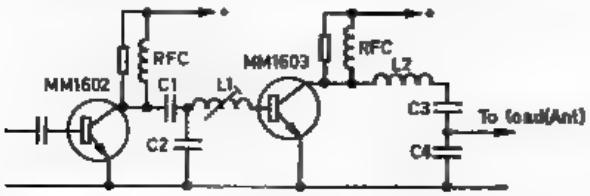


FIG. 22. BASIC P.A. CIRCUIT.

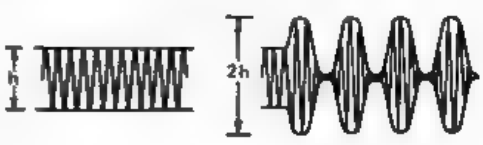


FIG. 24. ENVELOPE PATTERNS.

ence will now be made to the basic p.a./driver circuit given in Fig. 22.

Both transistors are shunt fed with L1/C1/C2 forming the interstage matching network, while L2/C3/C4 acts as a series tuned matching network into the 50 ohm antenna.

Both RFC1 and RFC2 are important. At the operating frequency their impedance should be no higher than five times the impedance seen at the respective collectors. If it is any higher than this, or if it has a self resonance at a frequency close to the operating frequency, then the resultant "mismatch" between choke and collector will be high, the voltages developed at the collector will be higher and, in the light of previous comments, the probability of reaching the transistor "sudden death" voltage limit is also high.

To keep the choke impedances low at frequencies other than the operating frequency they are loaded with parallel resistors. Note that separate RFCs are necessary for each band. The matching networks used were adopted from the R.C.A. publication referred to earlier.

SPECIFIC DESIGN

Fig 23 gives the full schematic of the driver/p.a. section of the transceiver, while Table 1 gives all the appropriate component values and coil winding data.

It will be noted that a separate group of RFC1/L1/C1/C2 and RFC2/L2/C3/C4 are required for each band and are so switched.

Adjustment of the interstage coupling network is by means of the slug of L1 with C1 and C2 being standard values of fixed Philips ceramic bead capacitors.

The p.a. tank circuit uses a fixed value of inductance with C3 and C4 being made up of part fixed, part variable capacitors. The fixed capacitors are stacked silver mica paralleled with 20/220 pF Ducon ceramic "stamp" trimmers.

H.t. to the two stages is obtained from a common rail through two decoupling networks. Each network consists of a 2.5 microhenry choke and a paralleled combination of an 0.047 uF. ceramic disc and a 4.7 uF. tantalum capacitor.

A very important component is the 1,000 uF. 18 volt electrolytic capacitor across the h.t. line. This is necessary to prevent low frequency parasitics building up on the line and damaging the transistors.

In order to complete the design, three more "bits" remain to be described. They are:

(a) The resistance coupled single transistor matching network between the transmit mixers and the driver.
(b) The circuitry associated with p.a. power output measurement.
(c) A protected a.c. power supply.

These must, because of space reasons, be left over until next month.

AVAILABILITY

The complete four-band three transistor power stage including metering, bandswitch and sub-chassis, together with all components and hardware, will cost $88.50. It is regretted that because of supply problems on one component it will be mid June before delivery can be made. If requested, the kit will be supplied in two halves. All components and sub-chassis except for the three transistors will cost $26.80, while the three transistors alone will cost $61.70.

— . . . —

DRAFT STANDARDS FOR COLOUR T.V.

In accordance with the undertaking given by the Postmaster-General in announcing that the PAL system of colour television will be used in Australia, the Australian Broadcasting Control Board has circulated draft system standards to the industry, and on 10th April held a first meeting in Melbourne with industry representatives to discuss the standards.

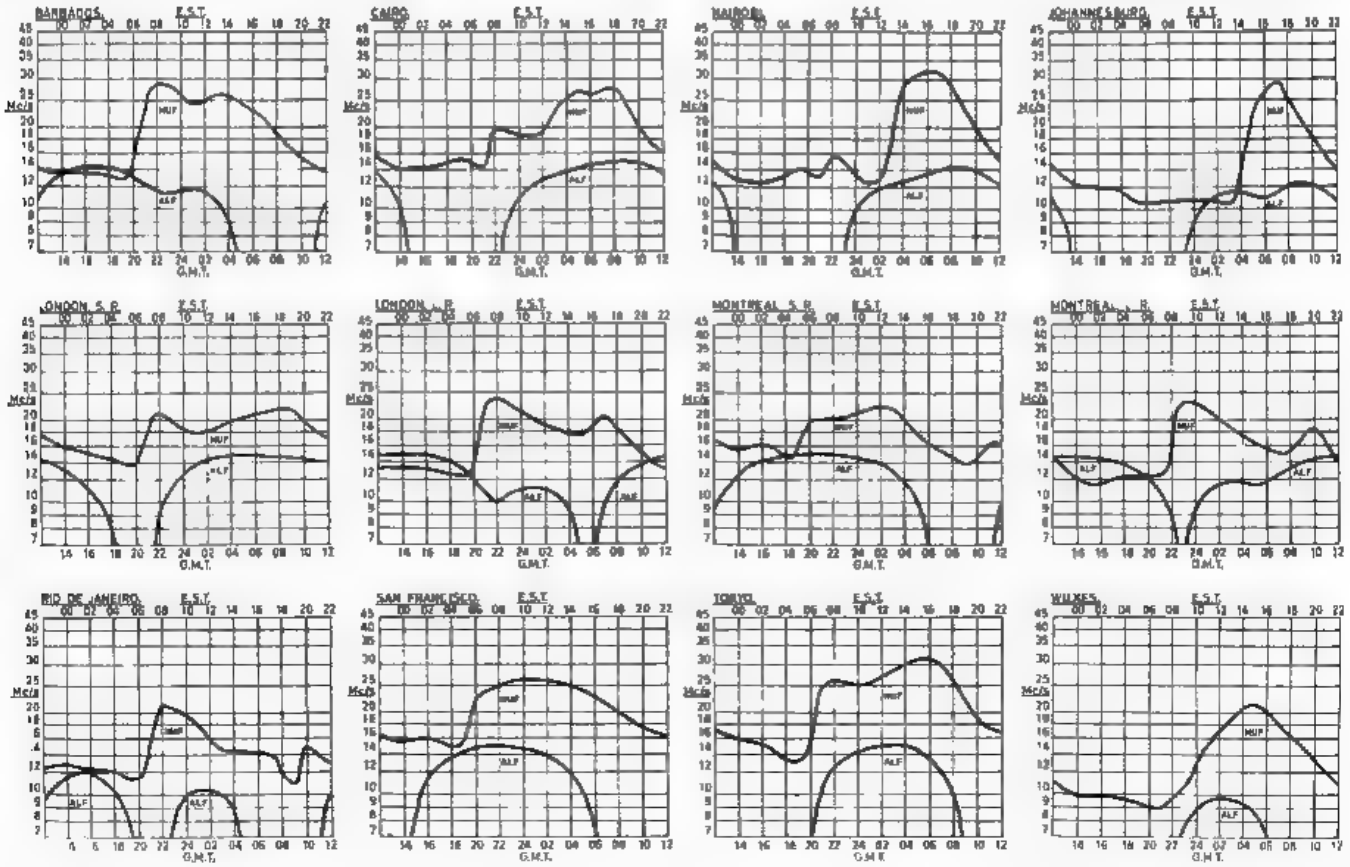
Forty-eight representatives from thirty-two organisations attended the meeting which decided to set up an industry committee to make recommendations to the Board on standards for radiated signals, required transmission tests, and later, detailed equipment standards.

The committee initially will comprise a small "steering committee" and four sub-committees dealing with transmitters, receivers, relays, and studio equipment respectively. It is intended that the membership of these sub-committees be flexible with experts being co-opted as required, to utilise the services of all sections of industry with a contribution to make.

The meeting elected as chairman of the committee Mr S F Brownlaw, Director Technical Services, of the Australian Broadcasting Control Board, to whom all inquiries should be addressed. The committee will report initial progress at the second industry meeting which was to have been held in Sydney on 24th May.

PREDICTION CHARTS FOR JUNE 1969

(Prediction Charts by courtesy of Ionospheric Prediction Service)



NEW 1296 Mc. RECORD

On Sunday, 29th December, 1968, the present 1296 Mc record of 46.8 miles, held by VK2ZAC and VK2ZCF/2 since 4th March, 1964, was broken Contact was established over a 53-mile line of sight path between VK4KE/4 (Tom Fishpool) on Mt. Mowbullan, 3,600 ft., in the Bunya Mountains and VK4ZT (Neil Sandford) operating from a platform on the roof on his house at 18 Loch Street in Toowoomba The contact was held from 1245 to 1335 E.S.T. with rock solid 5 x 9 signals both ways. 144 Mc. was used to establish contact with slightly lower signal strengths.

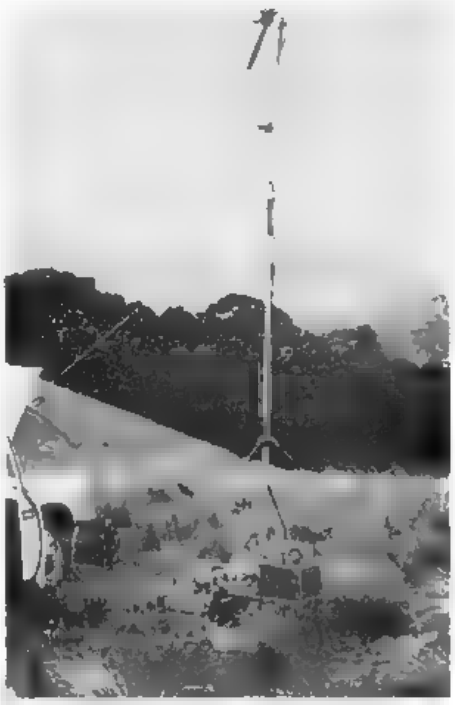
On Sunday, 5th January, 1969, the 53-mile record was extended to approximately 112 miles with VK4KE/4 operating from the same site at Mt. Mowbullan to VK4ZT/4 one mile south of Mt. Magnus in the Passchendaele State Forest. Initial signals were 5 x 9 both ways on 144 Mc. However, the 1296 Mc. signal was only 559 both ways with phone unsuccessful, due mainly to modulation problems.

An improvement was obtained when VK4ZT/4 moved his equipment about 30 ft. higher up the side of an abandoned fire tower, allowing two-way 4 x 4 phone contact from 1330 to 1500 E.S.T. Much of the time was spent setting deviation and generally optimising equipment. The major cause for the lower 1296 Mc. signals was due to obstruction at VK4ZT's end by Mt. Magnus and also to further obstruction by a large area of high ground in the centre of the path. The exact path length of this contact is not known due to delays in obtaining a suitable map of the area, so no formal claim was made for this record.

However, this problem was overcome on Sunday, 2nd February, 1969, by establishing contact over a distance of 138.2 miles (subject to confirmation) between VK4KE/4 on the top of Mt. Mowbullan and VK4ZT/4 on a site near Springbrook on the Queensland side of the N.S.W. border at 3,300 ft. elevation.

A VK2/VK4 contact was not possible as the border is close to a precipice and a few steps in that direction would have resulted in a drop of about 2,000 ft.

The 138-mile path is obstructed almost 1,000 ft. by the Ravensbourne Ridge, 50 miles from Mt. Mowbullan end. Maps showed that this ridge would be visible from both ends, so "knife edge diffraction" could be expected. Good solid contact was established on 144 Mc., but initial contact on 1296 Mc. resulted in 569 c.w. both ways with poor phone due to heavy QSB. This was thought to be due to foreground reflections at the Springbrook end, so the equipment was moved about 100 yards East and some 10 ft. lower in altitude to a position that gave an almost perfect take-off. The improvement in signals gave a solid 5 x 5 phone contact both ways with negligible QSB.



VK4KE/P at Mt. Mowbullan, Bunya Mts. 1296 Mc. equipment and corner reflector antenna; 3 el 144 Mc. yagi (53-mile contact with VK4ZT at Toowoomba)

EQUIPMENT USED

VK4KE used his normal portable crystal controlled valved tx with a QQV03/10 final giving about 8 watts out at 144 Mc. of a.m., n.b.f.m., or c.w. 1296 Mc. output is produced by varactor triplers 144-432 Mc. with 4 watts output and 432-1296 Mc. with 2 watts output. The antenna on the first two attempts was a corner reflector with an estimated gain of 12 db. For the 138-mile contact a 6 ft. parabola, built in eight sections for ease of transport, was constructed with an estimated gain of 24 db. The feeder loss approached 1 db., giving an e.r.p. of around 400 watts.

The receiver consists of a solid state crystal controlled diode mixer converter with noise figure of 10 db. The 18 Mc. i.f. is tuned by an Eddystone EC10, modified to improve frequency stability and also fitted with a n.b.f.m. discriminator for the last attempt. The overall bandwidth is around 6 Kc. and all equipment operates from the 12v. vehicle battery.

VK4ZT used all solid state equipment. The n.b.f.m. or f.s.k. c.w. crystal controlled tx produces 5 watts output at 144 Mc. from a 12v. supply. Varactor triplers similar to VK4KE's produce 3.2 watts at 432 Mc. and only 0.5 watt at 1296 Mc. The lower output at 1296 Mc. is due to the use of a cheap varactor intended for use up to 432 Mc.

The antenna used for all contacts was a 5 ft. parabola built with ¾" x ¾" timber and flyscreen mesh at a cost of about $4. It is built in one piece and carried on the vehicle roofrack. The estimated gain is 23 db. with negligible

(Continued on Page 14)

VK4ZT's 1296 Mc set-up with VK4ZP in attendance. 144 Mc yagi in corner.

VK4ZT's gear 144 Mc. solid state 5 watt output tx in top of cardboard box Modified BC454 rx and 144 Mc. converter below. 12v supply in wooden box

A FET GATE DIP OSCILLATOR*

PETER J. RODDA,† ZL1BEB

Recently I required a more portable GDO than the one I already had. The circuit, as shown in Fig. 1, was tried. At present the frequency coverage is 1.5 Mc. to 100 Mc. in four bands and coils will later be wound to cover down to 400 Kc. or lower.

Above 1.5 Mc. the FET functions as a Colpitts oscillator. As the high LC ratio tends to cause unstable oscillation below 1.5 Mc., the coils for these frequencies should be centre tapped, changing the circuit to a Hartley oscillator. If the amplitude of oscillation is too high, the taps should be moved nearer the gate end of the coil.

The oscillator is followed by a simple transistor d.c. amplifier to enable the use of a cheap 1 mA. meter.

The 2N3819 is a N channel FET and the MPF102, 2N3823 could also be used. The transistor is not critical and any NPN AF junction type can be used. If a P channel FET, such as the 2N3820, 2N4360, is used, reverse the supply polarity and use a PNP AF junction transistor in the d.c. amplifier.

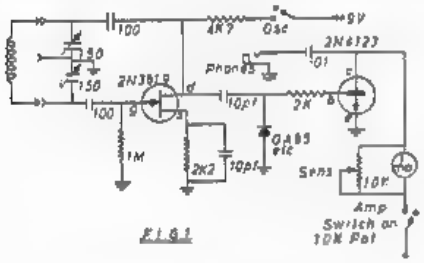


Fig 1

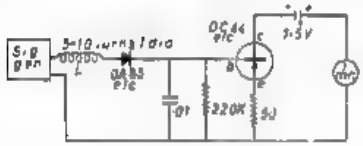


FIG 2.

The coils are wound on ¾ inch plastic formers and are as follows:

1.5 to 5 Mc.—150 uH., 130 turns, No. 36 enamel, close-wound.

4.5 to 15 Mc.—17 uH., 29 turns, No. 30 enamel, close-wound.

13 to 36 Mc.—2 uH., 9 turns, No. 22 enamel, close-wound

35 to 100 Mc.—0.5 uH., 4 turns, No. 18 enamel, close-wound.

This coil data is only approximate and will depend on the tuning gang available, layout, etc.

CALIBRATION

Calibration can be carried out using a general coverage receiver or the circuit shown in Fig. 2. (This circuit is from Technical Topics—which is a very worthwhile investment.)

When using a receiver care must be taken that you are not calibrating against a harmonic. If the circuit of Fig. 2 is used, no indication will be given on any harmonic.

Set the signal generator to the required range and adjust the output until a suitable meter reading is obtained. The GDO is then coupled to L and this should cause an increase in the meter reading except when the GDO frequency coincides with that of the signal generator, when a very sharp dip will occur. To find the exact centre of the dip, it will usually be necessary to increase the coupling to L.

LAYOUT

Layout is not critical although it pays to keep the leads in the oscillator circuit as short as possible.

The chassis dimensions of mine is 7 in. long, 2½ in. wide and 2½ in. deep. This is small enough for easy handling and has a reasonable size dial, but not so small as to have the controls cramped up.

* Reprinted from "Break-In," November 1968.

† Cape Brett Lighthouse, Private Bag, Russell, New Zealand.

NEW 1296 Mc. RECORD

(Continued from Page 13)

feeder loss as both triplers and the converter are mounted on the rear of the parabola. The e.r.p. is around 100 watts. In both cases the feed is a dipole with integral balun and half wave disc as a reflector. Three element yagis were used on 144 Mc. at both ends.

The receive equipment consists of a converter similar to VK4KE's with 10 db. n.f. The 30 Mc i.f. is tuned with a modified BC454 Command rx. The front-end has been modified from the original 3-6 Mc. to tune 28-30 Mc., giving improved frequency stability with the use of FETs. The remainder of the receiver has been modified along the lines of the May "A.R." article except that all valve sockets have been discarded and the FET/transistors built into the appropriate cans. A n.b.f.m. ratio detector is also fitted. The overall bandwidth is 8 Kc. The total 12v. battery consumption is under 1 watt on receive and about 10 watts on transmit.

The success of this QRP project may be attributed mainly to the use of narrowband techniques. The crystal stability of the signals at 1296 Mc. would be adequate for s.s.b. and surpasses many of the 144 Mc. signals heard in the area. Articles for publication in "A.R." are currently under way in the hope that this will stimulate activity and also encourage the use of solid state techniques.

INTRUDER WATCH GETS INTO GEAR

Intruder Watch is really under way. An Intruder Watch bulletin has been instituted, copies of this bulletin (of which there will be three or four issues a year) are being sent to Divisional Intruder Watch Co-ordinators for distribution

One particular feature of the current Intruder Watch programme is an innovation introduced concurrently with the introduction of the Intruder Watch bulletin, that is the W.I.A. Intruder Watch will be paying particular attention to a particular band during a specified period. This concentration of effort is not intended to discourage observations on any other band.

However by paying attention to a particular band on an Australia-wide basis, maximum information on that band can be obtained and collated.

May, June and July is the period set aside for particular attention to be paid to the frequency segment 7.000 to 7.100 Mc August, September and October is the period set aside for particular attention to be given to the 20 metre band.

Intrusions into Amateur bands apparently emanating from within the Commonwealth pose a quite different problem from intruders apparently emanating from overseas countries. Accordingly intruder watchers have been told to immediately and urgently pass on reports of any intruder station apparently located within the Commonwealth.

Amateurs observing such intruders should contact either their Divisional Intruder Watch Co-ordinator or write direct to the Federal Intruder Watch Co-ordinator, Box 36, East Melbourne, Vic., 3002

A list of Divisional Intruder Watch Co-ordinators is set out below.

—David Wardlaw, VK3ADW,
Federal Intruder Watch Co-ordinator.

STATE INTRUDER WATCH CO-ORDINATORS

VK2—W. H. R. Treloar, VK2BPZ, 23/3 Fullerton St., Woollahra, N.S.W., 2025.

VK3—M. P. Davis, VK3ANG, 144 Tramway Pde., Beaumaris, Vic., 3193.

VK4—Cec Kenny, 19 Lithgow St., Wynnum North, Qld., 4178

VK5—John Bulling, VK5KX, 297 Goodwood St., Kings Park, South Aus., 5034.

VK6—G Allen, 283 Amelia St., Balga, Western Aus., 6061

VK7—D. H. Kelly, VK7DK, 56 Upper Brougham St., Launceston, Tas., 7250.

AMATEUR FREQUENCIES·

ONLY THE STRONG GO ON—SO SHOULD A LOT MORE AMATEURS!

A NEW 432 Mc. AMATEUR T.V. RECORD

BY M. J. LANE, VK5AO/T, AND A. W. PIERSON, VK5ZBP/T*

An earlier attempt at establishing a long distance 432 Mc. t.v. link-up was made on 9th October, 1966, when one-way t.v. communication was established between Willunga Hill and South Hummocks. This attempt was in the nature of a research project, aimed at establishing the feasibility of long distance line-of-sight communication, transmitting wide bandwidth information (e.g. a television picture) with low transmitter powers (in the order of 10-20 watts).

The experiment which was performed during a W.I.C.E.N. exercise (the staff at the receiving end were W.I.C.E.N. operators), proved eminently successful and although severe fading occurred, the received signal was at times very strong. As a result, we obtained some clear, noise-free photographs from the monitor screen at the Hummocks.

The crew at South Hummocks T.v. gear was in car with receiver outside. Alternator was 200 feet away

Heartened by this success, we decided to establish a t.v. distance record, with the added refinement of two-way picture communication and intercarrier sound on both vision transmitters. Our first two-way t.v. attempt was foiled, due to poor weather conditions (i.e. we were almost drowned), and a phantom fault in the gear, which we were unable to pin down exactly, but the end result was only one-way communication—in the same direction as before.

The successful attempt was carried out on 16th February, 1969. The prevailing weather conditions were very unfavourable, however. Hot, dry winds whipped across the up-track to the Hummocks, producing a thick layer of dust in which the wheels of our vehicles had almost no traction. We were towing a trailer full of gear, made additionally heavy by the presence of a large 2kva. alternator and internal combustion engine, both of which were not designed with lightness in mind. After a two-hour fight, we saw no possibility of reaching the Hummocks Trig. Point, so it was decided to make the attempt from a more accessible, but lower, hilltop.

The gear was set up four hours later than at first planned, but our spirits were high, since the presence of signals from the VK6 Beacon at Albany on 2 metres in Adelaide indicated very favourable v.h.f. conditions. Our hopes were rewarded as VK5ZEF/T was picked up with good signal strength approximately one hour after we selected our new position. VK5AO/T then returned with a transmission, establishing a two-way record for video and sound on 432 Mc. The exact distance, as accurately determined from government survey maps was 93 miles.

All gear concerned in the attempt was home-brewed, including the vidicon cameras which were used to send live pictures both ways. This added much interest and challenge to the exercise, since the cameras had to be set up accurately. We also learned the value of lightweight transistorised equipment, since Mait's camera is a valve chain and although an excellent performer in the studio, it proved a little cumbersome to manhandle around on our expedition.

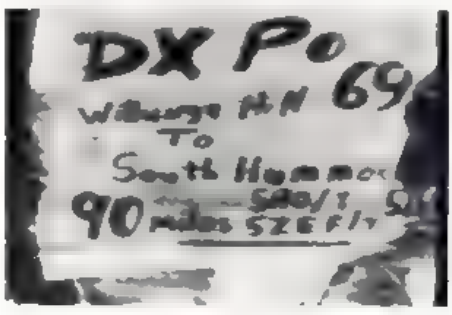
Video equipment at Willunga Hill was provided by Alan Nation. His transistorised camera, camera control unit, converter and receiver were all operated from a 12 volt car battery. Ray VK5ZEF/T used a QQE06/40 running 30 watts. A 5.5 Mc. f.m. sound carrier was injected into the video modulator and was transmitted as part of the video signal.

At the Hummocks, Mait VK5AO/T's transmitter ran 20 watts to a QQE03/20, but the method he used to produce intercarrier sound followed commercial practice, in that a separate transmitter

The crew at Willunga Hill

Picture received at Willunga Hill Camera and monitor was enclosed in a light-proof housing. The actual distance scaled from the Adelaide Land Department map was 93 miles.

Starting up the alternator



Picture received at South Hummocks. The bars in the picture were from the alternator. Note stray light entering camera housing. Photography posed a problem as the exercise was carried out in mid afternoon. Distance from Adelaide Land Department map was 93 miles.

generated the 5.5 Mc f.m. sound signal. This unit ran 5 watts to a QQE02/5, the sound carrier being radiated from a separate 5 element yagi, whereas both ends used 16 element collinear arrays for transmission and reception of the 432 Mc. video signal.

Two metre communications were handled by Rick VK5ZFQ and Arno VK5ZAR at the Hummocks, whilst Jim VK5ZGV operated at Willunga Hill. Signals on 2 mx f.m. were strength 9 plus and saturating the receivers, proving that there is no substitute for a line-of-sight path!

BIBLIOGRAPHY

References to our first record attempt in 1966 may be found in "Siran" ATV issue, 1967, pages 39-40. Also "Amateur Radio" v.h.f notes, S.A., Dec. 1966. "CQ" TV No. 63.

* Public Relations Officer South Australian Amateur T.V. Group. Address: 1 Bindana Ave., Salisbury Park, S.A., 5109.

1969 John Moyle Memorial National Field Day Results

Certificate winners are indicated in bold type.

SIX-HOUR DIVISION

Section A

Call Sign	Score	Power
VK1ML/P	62 pts.	
VK2ASZ/P	**541 pts.**	
VK2AHV/P	225 pts.	
VK2RJ/P	115 pts.	
VK3AQP/P	429 pts.	
VK3AYZ/P	304 pts.	18 w.
VK3AIH/P	253 pts.	10 w.
VK3AOT/P	247 pts.	35 w.
VK4PJ/P	406 pts.	300 w.
VK4GT/P	268 pts.	120 w.
VK4OF/P	100 pts.	
VK5WV/P	172 pts.	
VK5XY/P	108 pts.	8 w.
VK5EK/P	76 pts.	
VK5ZEJ/P	66 pts.	15 w.
VK5QZ/P	56 pts.	
VK5TL/P	34 pts.	

Section B

VK2JM/P	**123 pts.**	
VK2YB/P	111 pts.	

Section C

VK3HE/P	**150 pts.**	8 w.

Section D

VK3KI/P	**729 pts.**	

Section E

VK3UG	30 pts.	
VK5TN	**120 pts.**	

24-HOUR DIVISION

Section A

Call Sign	Score	Power
VK3DY/P	**1019 pts.**	
VK3ADP/P	358 pts.	12 w.
VK3AQQ/P	273 pts.	15 w.
VK5ZBT/P	112 pts.	3/5 w.

Section B

VK3ALZ/P	160 pts.	
VK5ZF/P	**186 pts.**	

Section C

VK3EZ/P	**314 pts.**	15 w.

Section D

VK1ACA/P	2075 pts.	
VK2AAH/P	**7313 pts.**	
VK3ATL/P	4271 pts.	
VK3APC/P	4214 pts.	
VK3ATO/P	3210 pts.	
VK4IO/P	1365 pts.	
VK9XI/P	623 pts.	150 w.

Other logs for checking purposes VK7PA and VK6MM.

RECEIVING (Section F)

6-Hour Division

L3366—D. Elkan	315 pts.	
L3377—T. Hambling	310	„
L3389—K. Sutcliffe	185	„
L4018—C. Thorpe	185	„
M. Joyce	130	„
L5096—C. Hannaford	1015	„
L5015—W. Clayson	189*	„
L5088—S. Ruediger	129*	„

24-Hour Division

L2246—B. Beamish	445*	„
L3308—K. Cox	430*	„
L3042—E. Trebilcock	175	„

*Correct, scoring errors

LOCATION AND EQUIPMENT

VK1ML/P: Mt. Coree. MTR25, 9 el. yagi, Honda 300.

VK2ASZ/P: Camden. Drake TR3, f.m. tx/rx, petrol gen.

VK2AHV/P: Yanco Weir. 122 tx/rx, dipole ant.

VK2RJ/P: Newcastle. Galaxy V., Webster ant.

VK3AQP/P: Somers. Swan 140 modified, "VK Special" ant.

VK3AYZ/P: Mt. Macedon. 122 tx/rx, dipole ant.

VK3AIH/P: Mt. Clay. home-brew mobile and inverted "V" ant.

VK3AOT/P: Cobar Lookout. Home-brew mobile, Eico 753 rx.

VK4PJ/P: Calmslie. Galaxy V., Aztec p.s., dipoles.

VK4GT/P: Red Banks Plains. Eico 753, Pye Mk. 1.

VK4OF/P: Whites Hill. Swan 240, whip ants.

VK5WV/P: Steepacres. Pye and T.C.A. tx/rx's.

VK5XY/P: Tea Tree Gully. 122 tx/rx, long-wire ant.

VK5EK/P: Mt. Lofty. TCA1649, coaxial dipole.

VK5ZEJ/P: 40 miles east of Adelaide. Home-brew equipment.

VK5QZ/P: Chandlers Hill. Home-brew equipment.

VK5TL/P: Bellevue Heights. Pye Reporter.

VK2JM/P: Cape Banks. Converted Command equipment.

VK2YB/P: Cape Banks. ATR2B, windom ant.

VK3HE/P: Warrandyte. Type AMKS.

VK3KI/P: Red Hill. Galaxy V., Drake TR4, STC f.m.

VK3DY/P: Lake Glenmaggie. Galaxy V., dipoles, Honda

VK3ADP/P: Mt. Waverley. No. 62 set.

VK3AQQ/P: Alfred National Park. Type 3 Mk. 2, home-brew bat. charger, petrol driven (till it seized up!).

VK5ZBT/P: Mt. Osmond. PTCA, TCA.

VK3ALZ/P. Pretty Sally. Home-brew tx, Halli. S29.

VK5ZF/P: Richmond. Home-brew tx/rx, inverted "L" ant.

VK3EZ/P: Macclesfield. Home-brew tx, Eddystone EC10.

VK1ACA/P: Mt. Ginini. 40m., Heathkit SB101; 80-15-10m., SR150 tx/rx; 20-15m., 7553 rx, 3251.; 6m. a.m., home-built tx/rx; 2m., 50w. f.m. base station; 2m. a.m., h.b. tx, FET con., 75S2; 70cm., 9w. h.b. tx, Nuvista con., 75S2.

VK2AAH/P. Bald Mountain. SW400, KWM2, home-built a.m.

VK3ATL/P: Peter's Hill. 80-40-20m., 120w. Y.M. FL50, Knight rx; 40-20-15m., 350w. Swan 350; 40-20-15-10m., 400w. FR100B, FL200B, FL2000; 6m., 10w. Pye Mk. 3; 144 Mc., 10w. h.b. equip.; 2m., Ch. A, B, 20w. TCA1674; 2m., Ch. A, B, C, 25w. TCA1674.

VK3APC/P Myrniong. 160m., Eddy. EC10, h.b. 20w. tx; 80m., FL100, FR100; 40m., Galaxy V.; 20m., FL200, FR100, FL1000; 15m., FR-100, FL100; 10m., FT100B; 2m., 6m., 50/30w. h.b. tx.

VK3ATO/P: Tantraboo. 160m., Type 62; 80-40-20-15-10m., commercial equip.; 6m., Pye; 2m., MR3A and h.b.

VK4IO/P: Mt. Crosby. 80-40m., h.b. s.s.b.; 20m., Heathkit HW32A; 40-15m., Geloso 222; 6m. a.m., Contax Carfone; 2m. f.m., Pye Ranger.

VK9XI/P: Cliffside location. FT200, Hammarlund 170A.

COMMENTS

Again this year, queries have arisen regarding the Rules of the Contest. In an effort to overcome any misunderstanding, some re-wording will take place in next year's Rules. To give prior notice of the change, here they are:—

Under "Objects", new wording—in VK Call Areas and Overseas/Foreign Call Areas

Rule 6, new wording to read: "The exchange of serial numbers, consisting of RS or RST report, plus three figures, commencing with 001 and increasing by one for each contact by the VK station, shall be proof of contact".

Rule 12, new wording to read, after "each section of each division; except section (f) where a certificate will be awarded to top scorer in VK for each division."

To VK2AAH/P go top marks for their excellent effort of 7,313 points. As to our commenting on their logs, their story is better told by VK2SG, whose comments were:

"And so another field day has come and gone, another score has been made, and, maybe another record has been created—who knows. In the main, the organisation was the same as for last year, in that all bands were worked from 80 mx through to 2 mx; in all, seven operators were in attendance plus two associates, making a team of nine persons. None of these had the pleasure of loafing or having lots of sleep for all personnel were organised to either operate or to look after the generator, re-fuelling same and to the re-fuelling of the operators.

"The site was the same as last year's operation on top of a 4,000 ft. mountain near Lithgow, about 52 miles west of Sydney. By this time we have become well known in the area and as soon as we arrived there the local flies welcomed us with open arms and called all their mates to join in the feast. If we had had as good communication as the flies, our score would have been three times as large, so maybe flies know more about communication than we poor mortals do!

"We arrived at the site early Saturday morning and proceeded to erect tents and aerials, ran power leads, and set up the 7.5kva. generator, and in

general proceeded to prepare ourselves for the battle ahead. In between these activities we discussed what the bands would be like, who would be operating from other portable sites and what the weather would be like in the early morning, when it is usually cold and damp in the cloud tops that flow over the mountains. As most of us were doing all the usual setting up jobs, our appointed cook was bashing away at the evening meal. All I can say is that if his standard of cooking improves as it has over the last few years, I am afraid that we will have to stand guard over the camp to stop intruders from other portables stealing our food—or, worse still, stealing our cook.

"Our aerial systems consisted of the following: 3.5 Mc., bottom loaded vertical; 7 Mc., ¼ wave vertical; 14 Mc., two el. yagi 45 ft. high; 21 Mc., two el. yagi, 30 ft high; 28 Mc., three el. yagi, 30 ft. high; 52 Mc., four el. yagi; 144 Mc., ten el. yagi, multi el. stacked colinear; 146 Mc., four el. yagi.

"Power was supplied by a 7.5 kva. generator driven by a petrol engine. This engine was stopped every three hours for re-fuelling purposes. These re-fuelling periods were the only rest periods that some of the operators had for the 24-hour period.

"The equipment used consisted of two KWM2s, two SW400s. Three linears running 400w. output before anyone else spoke, because any time any of the other boys hit their linears the power kind of went down about 100w. On the v.h.f. bands, we had a large amount of home-brew gear as well as some f.m. sets. In the main we had the bands fairly well covered.

"At this point I would hate to mention the score that we put on record, because being a sensitive type I hate to embarrass people, but a thought keeps coming into my head—where the heck were the other VK stations that were supposed to be in the contest? Sure, we worked a few here and there, but I feel that there should have been a lot more around; maybe we missed them. But on second thoughts, some of the boys may like a breakdown of the score so that they may compare their efforts with ours, so here goes.

3.5 Mc.	200	points	27	contacts
7 Mc.	1219	"	212	"
14 Mc.	2920	"	574	"
21 Mc.	1231	"	244	"
28 Mc.	1142	"	228	"
52 Mc.	130	"	25	"
144 Mc.	471	"	101	"
	7313	points	1411	contacts

"As can be seen from the scores on the various bands, the aerials and the rigs worked well. I think it can be said that the operators worked well, too, though I still have the feeling that the bands were not as good as they were the year before. There were certainly not the dog piles on 14 Mc. that there were last year, and yet the band seemed to be open for longer periods in that we were working W stations right through the daylight hours. Also, 10 metres did not open as it did last year, but other bands gave of their best and some of the lower bands gave us some good contacts, and from it all one gets the feeling that anyone who says that they cannot work DX on 40 or 80 metres are definitely not trying. On the v.h.f. bands the old adage has again been proved that given a high location and good aerials, nothing is impossible. By the way, we are looking at the v.h.f. side of the operation to see if we can get linears going on these bands to give us 400 watts on 52 and 144 Mc., that should create a bit of a stir.

"We operated in the period from 1600 to 1600 which gave us ample time to set up and pull down, but as we were about 52 miles away from home most of us arrived home in the dark, and I think our main thoughts were of such things as a hot shower and sleep.

"Generally speaking, we feel that we have done a good job in the field day; we have organised ourselves a good team and a good set-up, but there is one thing that we cannot seem to organise and that is competition—I mean real stiff competition, someone that will give us a run for our money. We have tried various tricks to make people have a shot at us but so far no luck. We are not geniuses; surely someone can get themselves set up to do as we do. If there is anyone who wants some ideas on running a field day, well, if they get in touch with us, we will help them with the information.

"As you may notice, I have not made any mention of the operators concerned. Well, the operators know who were there and as such they are happy that they have done a good job, and they are looking forward to next year.

"And so, until next year when we will be 'at it again' with maybe a better score, all the best and hope to hear from you that we have some good competition."—VK2AAH/P, per VK2SG

Another operator, VK5ZEJ, now VK5LP, who, through his Federal Councillor, took me to task for not answering his comments with his logs, expressed disappointment at the low number of stations that participated in the Contest, particularly from the portable angle. This is a trend in Australia at least, as the W.I.A. sponsored contests appear to be losing participants.

VK3ATO gave a good account as a newcomer to the multi-op. station section. Operators were VKs 3AMZ, 3APB, 3AJX, 3VK, 3MO, 3APJ, 3YC, 3KO, 3DG, 3ZKV, 3ACT, 3AER, 3AGS, 3AAA, 3ZYX. They also sent in a very neat set of logs.

Operators of a rival VK3 multi-op. stations were VKs 3IC, 3AQR, 3ATF, 3ZUG, 3ADT, 3ASQ, 3ZIB, 3ZXY of VK3ATL, who found Peter's Hill in the Otway Ranges suitable for their operation.

For the information of VK1ACA and others, if a station works an operator as a mobile, then later as fixed, or vice versa, it may be considered as two separate stations. So therefore nine points were not deducted from your score, VK1ACA!

A definite ruling on working through a repeater has yet to be formulated. In the meantime, this method of operation will be allowed, but a note to its use when doing so is asked for to help the committee formulate a rule.

Not without mention was VK4IO operating at Mt. Crosby. Operators were VKs 4RG, 4HW, 4ZN, 4KO, 4ZLG, 4ZJE. A good first effort from them was noted.

And last, but not least, is the club station that could never have a headache. The list of operators is almost too long to print, but as other club operators have their call sign listed, one must do the right thing—VKs 3XK, 3ASL, 3KV, 3AKJ, 3APD, 3AFQ, 3LC, 3XV, 3CB, 3JI, 3VT, 3AYI, 3ARR, 3ZAK, 3AKK, 3ZNJ, 3ZOP, 3ARO, Bob Jordon, Ron Butler, Bruce Herbert and, quote, "also sundry unnamed male harmonics, blow-ins, girl friends, local councillors and other rubbernecks who contributed not one point to the score", unquote. These operators put the strong voice of VK3APC/P on the air.

And that's all for this year. CU again next year. 73, Neil Penfold, VK6ZDK, for F.C.C.

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REMEMBRANCE DAY CONTEST 1969

The Federal Contest Committee wishes to advise all Amateurs that the complete rules for the Remembrance Day Contest 1969 will appear in the July issue of "Amateur Radio".

A number of changes resulting from the 1969 Federal Convention at Canberra will be incorporated and in doing this there has been insufficient time to meet the June issue deadline.

The major changes may be summarised as follows. (Read the following in conjunction with the 1968 rules appearing in July 1968 "A.R.," pp. 12 and 13.)

Contest dates: 16th and 17th August, 1969.

Rule 9: "9th Sept. 1968" becomes "8th Sept., 1969".

Rule 10: A new scoring table as discussed at Canberra will be used this year.

Awards: Some changes involving the status of VK1, VK8, VK9 and VK0 stations will be introduced.

Receiving Section.—Rule 3: Delete the last sentence commencing "VK1/VK2 and VK5/VK8 . . ."

THE 1969 FEDERAL CONVENTION—A REPORT

The 33rd Federal Convention of the Wireless Institute of Australia was held at the Hotel Canberra during Easter this year.

This venue represented a change in the practice of recent years of holding the Convention in each Division in rotation. The venue enabled more members of the Federal Executive to attend than would otherwise have been the case.

The Convention at Canberra was held with the concurrence of the New South Wales Division. That it was successful was due in no small measure to the ready assistance rendered by the Canberra Radio Society. The opening session of the Convention was devoted to the receipt of reports from the Federal President on behalf of the Executive, the Youth Radio Club Scheme, the QSL Bureaux, Intruder Watch, the Contest Committee, the Historical Officer, the Repeater Secretariat, the Federal Treasurer and the Publications Committee—a procedure that enables the review of all these activities that together constitute the area of Federal responsibility.

The agenda items were numerous and following the custom of the Federal body, were divided into six sections, namely constitution, administration, policy, I.T.U.-I.A.R.U., regulatory matters and contests. In relation to constitutional matters the Federal Council was requested by the Federal Executive to formulate an instruction to the Institute's solicitors to enable them to proceed with the incorporation of the new Federal Company.

Council had previously been advised by the Executive that the Victorian Attorney-General had raised objections to certain aspects of the proposed Articles of Association. Most of the objections were of a technical nature and offered little difficulty in their solution.

The Institute's solicitors had advised as to the alternative courses that were open. Most of the discussion turned on the Attorney-General's objection to the so-called "postal referendum provisions". In the hope that the relevant authorities in another State or Territory would take a different view of these provisions, it was decided to request the Institute's solicitor to consult with the solicitor for the New South Wales Division in order to further investigate this suggestion.

If no solution could be found, it was resolved to proceed with the incorporation of the Federal Company, omitting these provisions and otherwise proceeding on the basis of the solicitor's advice. These conclusions were reached unanimously.

The Federal Council then turned to several agenda items moved by the New South Wales Division seeking the amendment of the present Federal Constitution to delete references to a headquarter's division and to change a policy decision which had previously stated that Federal Executive should be located in Melbourne so long as the Central Administration of the Radio Branch is located there.

The New South Wales Division, through its Federal Councillor, pointed out that it was able and ready to provide a Federal Executive and was anxious to take a greater part in Federal affairs.

Ultimately, after careful discussion, these motions were all defeated. A motion designed to alter the Institute's financial year to coincide with a calendar year was passed. The object of the motion was to enable the easier presentation of audited accounts to the Federal Convention and to Divisional Annual General Meetings.

With the increasing complexity of the Institute's financial affairs, sufficient time was not at present allowed. The Federal Council then turned to those agenda items in the category of administration.

A price increase of 1c per copy in the cost of "A.R." to Divisions was agreed to by a majority. In the context of this discussion, reliance was placed on a report prepared by a sub-committee of Federal Executive, following the previous Federal Convention's direction. The Editor of "A.R.," Mr. Ken Pincott, addressed the Convention in relation to the magazine generally, reporting on the success of the new format and of the magazine's new advertising arrangements. He warned, however, that costs were expected to continue to rise.

A motion from the Tasmanian Division sought to clarify the position of the Secretariat appointed to co-ordinate v.h.f. repeater activities. It was suggested that this matter had already been sufficiently clarified, but a majority of the Federal Councillors felt that the matter should be put beyond doubt and it was made clear that the Repeater Secretariat stood in the same relation to the Secretariat as did the Federal Contest Committee and other Federal Committees. The Executive would appoint the Chairman of the Secretariat who would be responsible to the Executive. The Secretariat will continue to be provided by the New South Wales Division for the next three years.

The ambit of responsibility of the Repeater Secretariat was extended to include a general advisory function in the utilisation of the 144 and 432 Mc. bands. The Federal Executive was instructed to investigate the possibility of appropriate standards being adopted to control television receivers. This motion was introduced by the Victorian Division which argued that the introduction of solid state t.v. tuners with poor cross modulation characteristics, could prejudice Australian Amateurs.

Illegal operation on frequencies around 27 Mc. were discussed, and the Federal Council resolved to make clear its opposition to these practices.

Only three motions categorised as policy matters were raised. It was resolved by the Federal Council that a Division acting as a host Division to a Federal Convention could elect to hold a convention at a venue other than the capital city.

In the course of the Federal Convention last year the President of N.Z.A.R.T., Mr. Harry Burton, invited the Federal President of the Wireless Institute to attend the 1969 N.Z.A.R.T. Conference at Gisborne. The Federal Council resolved to meet the Federal President's expenses in travelling to and from Gisborne. Federal Councillors expressed the view that a closer relationship between N.Z.A.R.T. and the W.I.A. was desirable and a closer understanding could only arise by personal contact.

Considerable time was devoted by the Convention to the question of I.A.R.U. The Federal Executive reported in detail on its activities in relation to this matter and the Federal Council ratified the action taken by the Executive.

These matters are referred to in detail in the retiring President's report published in full in May "Amateur Radio".

The general policy question as to whether or not it was appropriate or desirable for members of the Executive to undertake the dual role of also acting as members of the I.A.R.U. Secretariat was discussed in some detail.

The conclusion of the Federal Council was that at least in this interim period, this was the most appropriate course to adopt. It was resolved that the Federal Executive should nominate for appointment by the Federal Council, the W.I.A. Region III. Director, his appointment to run for a term of three years. It was also resolved that the Secretariat be appointed by the Federal Council in consultation with the Director. The members of the Secretariat could include voting members of the Federal Executive.

Expressing the sentiment of the Federal Council, the relevant motion stated that the Secretariat should be given the widest powers to develop the Region III. Association.

Under the category of regulatory matters, a motion requesting the Executive to approach the Postmaster General's Department to delete the words, "by voice" from paragraph 33 of the Handbook, was discussed and agreed to. Likewise it was decided to seek clarification of the activities that could be undertaken by recognised Amateur civil emergency networks.

In relation to this and a number of other matters, it was pointed out by the Executive that some of the matters raised were not questions of general principle but really the application of rules to particular cases. The Divisions were urged to keep this distinction in mind and where a particular case appeared to have received unfavourable treatment, that particular case could be referred by the Division to the Federal Executive.

A proposal that originated in 1962, that all call signs for Australian territories presently identified by VK8, VK2 or VK9 prefixes, be identified by a distinctive call to identify the area, was referred to Executive. Executive reported to the Council on the Department's previously expressed attitude and suggested that on this matter the Council should not be over optimistic.

It was also pointed out that Amateurs in the areas concerned, may themselves, not wish to alter their present call signs.

A number of motions were discussed under the general heading of "contests". The VK3 160 metre band contest will now be adopted as a Federal contest of the Institute. The Federal Awards Manager will be asked to submit draft rules for a worked all bands award which will encompass all bands from 1.8 Mc. through to 21,000 Mc.

An amendment to the Australian DX, C.C. and V.H.F. Century Club Awards to allow credits for operation within a radius of 150 miles from a previous location was agreed to by the Federal Council. This motion was agreed to on the basis that a change from one call area to another (e.g. VK4 to VK3) across the border would be permitted. The present rules allow a licensee to move anywhere within his present call area which, for example in the Queensland Division, could be a distance of 1,500 miles.

Discussion also took place on the various proposals for the Amateur Service to celebrate the Cook bi-centenary. The Executive advised the Council of the steps that it had taken in relation to this matter.

Last, but not least, proposals to modify the rules and scoring arrangements for the Remembrance Day Contest were referred to the Federal Contest Committee.

At the opening of the Convention the Federal President, John Battrick, VK3OR, had announced that at the conclusion of the Convention he would retire both as Federal President, and as a member of the Executive. The Federal Council paid generous tribute to John's work as a member of Executive and as Federal President. With John's concurrence, however, the Council resolved to appoint him as W.I.A. Region III. Director.

Michael Owen, VK3KI, was appointed as Federal President, and David Rankin, VK3QV, was appointed Federal Vice-President.

The vacancy on the Federal Executive resulting from John's resignation was filled by David Wardlaw, VK3ADW. All these appointments were made unanimously.

A number of general business items were discussed, amongst these was a request for Executive to ascertain the Department's attitude to the requirement for metering points on equipment with low anode dissipations. The question of legislating for the prevention of ignition and allied interference was raised. The question of standards for Amateur colour t.v. was referred to Executive for further clarification.

Apart from the formal business of the Convention, all Federal Councillors and members of the Executive attended a dinner on Saturday evening, held in the Hotel Canberra. This dinner was also attended by members of the Canberra Radio Society and their wives. At this dinner, life membership was conferred on Arch Cox, VK1GU, the presentation being made by Pierce Healey, the New South Wales Federal Councillor.

On Sunday, a barbeque was held at the Cotter Dam. The Convention was formally closed on Sunday evening to enable the Western Australian Federal Councillor to return to his State on an early plane on Monday morning.

Those who were able to remain in the capital were taken on a conducted tour of the Tidbinbilla Deep Space Tracking Station, again by a courtesy of VK1 Amateur, Jim Weatherly, VK1QL.

The 1969 Federal Convention was certainly no less important than any of its predecessors. More ground was covered and more understanding reached than many hoped for.

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CONTEST CALENDAR

5th/6th July—R.S.G.B. 1.8 Mc. Contest.

5th/6th July—N.Z.A.R.T. Memorial Contest (3.5 Mc only)

16th/17th August—Remembrance Day Contest.

23rd/24th August—All Asian DX Contest (the J.A.R.L. c.w. only).

4th/5th October—VK-ZL-Oceania DX Contest 1969—Phone Section.

11th/12th October—VK-ZL-Oceania DX Contest 1969—C.w. Section.

11th/12th October R.S.G.B. 28 Mc. Telephony Contest.

25th/26th October—"CQ" W.W. DX Contest—Phone Section.

25th/26th October—R.S.G.B. 7 Mc C.w. Contest.

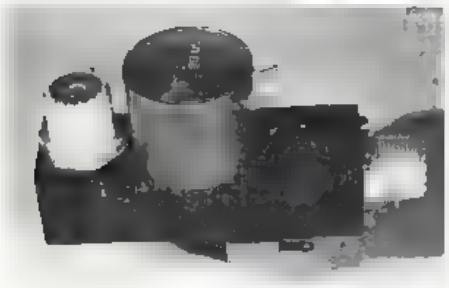
29th/30th November—"C" W.W. DX Contest—C.w. Section.

6th Dec. '69 to 11th Jan. '70—Ross A. Hull Memorial Contest.

1st/2nd Feb. '70—John Moyle National Field Day.

Technical Data

CO-AXIAL RELAY



The Dow-Key DK60 series of co-axial relays are ruggedly built and will qualify for a multitude of applications, including industrial, commercial and Amateur fields.

The DK60-2C type illustrated has a special isolation connector in the de-energised position to reduce cross-talk to a minimum. Dimensions: 2¾" x 3¾" x 1¾"; weight 9 oz. A range of coil ratings and voltages are available in the DK60 series with a choice of 50 ohm or 72 ohm loading.

Further information from R. H. Cunningham Pty. Ltd., 608 Collins Street, Melbourne, Vic., 3000.

R.F. METER

.The model PM501/T r.f. meter by Norwood will provide transmitter power readings from 3 mW. to 50 W., and is suitable for a range of commercial and Amateur applications.

Specifications.—Input impedance: 50 ohms. Frequency range: 2 to 220 Mc. Accuracy: Within 5% full scale. Power ranges: 0-500 mW., 0-5 w., 0-50 w.,; 0-30 watts continuous, 30-50 watts intermittent (60 seconds). V.s.w.r.: Better than 1.5 at 220 Mc. Size: 9½" w., 4" h., 4" d. Weight: 2.3 lbs. Price: $67.50 plus 15% sales tax.

Further information from: Radio Parts Pty. Ltd., 562 Spencer St., West Melbourne, or City and East Malvern (Vic.) branches.

NEW DUAL OPERATIONAL AMPLIFIER

A dual operational amplifier which provides a compact, low cost and low noise replacement for complicated discrete and electromechanical designs is now available from Fairchild.

The uA739, another of Fairchild's Second Generation linear integrated circuits, offers higher performance, added reliability and substantial savings over operational amplifier designs now in common use. The new product achieves high packing density through the use of a 14-lead Dual In-Line package, which contains two identical operational amplifiers on a single silicon chip.

Each amplifier of the uA739 has a differential input and a single-ended output capable of large swings (24 volts, peak to peak) without latch-up. Stable gain is maintained over a wide supply voltage range of ±4 volts to ±15 volts. The device provides high power supply rejection—50 microvolts per volt—which contributes to operating economy by reducing power supply filter requirements.

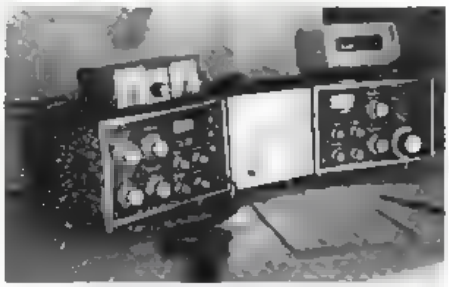
The input noise of this dual operational amplifier is typically 7 nanovolts per root Hertz and 1 picoampere per root Hertz at 1 Kc., or about half the level of the well known uA709. The uA739 also features a high slew rate of 1 volt per microsecond, bettering the 709 device by a factor of six.

Applications for the uA739 can be found in equipment such as instrumentation systems, audio units, telephone systems, process control systems, modulators, digital-to-analog converters, ground support equipment and computer peripheral equipment.

The uA739 is ideally suited for use as a stereo phono preamp., where it can replace up to 16 devices in discrete designs. Other application possibilities are as pulse generators, active filters, dual comparators, demodulators, integrators, oscillators, sense amplifiers, window detectors, stereo tape preamps., and level detectors.

Further information from Fairchild Australia Pty. Ltd., 420 Mt. Dandenong Road, Croydon, Vic., 3136.

INOUE 1C-700 TRANSCEIVER



Designed with the DX Amateur in mind, the 1C-700 covers all h.f. Amateur bands from 3.5 to 29.5 Mc. in 500 Kc. segments with 1 Kc. readout, plus WWV (10-10.5 Mc.) and three crystal controlled positions.

Receiver sensitivity is better than 1 microvolt. Bandwidth 2.4 Kc. and transmitter power input to 6146Bs a modest 150 watts for long life.

It operates on c.w. (with shifted carrier), s.s.b., a.m., p.t.t., vox and amplified a.l.c. are built in. Price $575 inc. sales tax.

Complete information on request to S. T Clark, 26 Bellevue Ave., Rosanna, Vic., 3084. Telephone 45-3002.

TWO METRE CONVERTER

A number of Amateurs who have ordered 2 metre converters have written to us mentioning the delay they have had in obtaining their converter kits. For this unfortunate delay we sincerely apologise, but we must point out that this has been entirely out of our control. We were guaranteed delivery of sufficient r.f. field effect transistors to supply all kits, however in reality, due to the manufacturing and despatch delays in America, the expected delivery dates became non existent. From time to time small quantities of these devices were made available for kits and contrary to the belief of some Interstate Amateurs have been uniformly distributed to every State in Australia

As we go to press, Motorola in America has assured us that our order will be delivered at the end of May and it is our firm conviction that all outstanding orders will be delivered during the first weeks in June.

Our policy has been to supply the best designed kits at the lowest possible price. This arrangement means that we can never absorb any increase in the price of components used in the kits without causing a loss to the W.I.A. As a direct consequence of this policy, the price of the 2 metre kit must rise to $13.50.

We anticipate an unlimited supply of kits will be available by the middle of June and that the problems encountered with this project will be circumvented with all future kits.

The next kit will be released in next month's "A.R." Watch for it! It's a ripper!

—VK3 V h f. Group

VK3 V.H.F. GROUP

2 METRE CONVERTER

(As detailed in "A.R." February '69)

Kits available for this Converter $13.50 each, post paid.

Cash with order to Victorian Division, W.I.A., P.O. Box 36, East Melbourne, Vic., 3002

This kit contains all components except crystal.

VK3 V.H.F. GROUP

6 METRE CONVERTER

Transistorised Kits as detailed in "A.R." November 1967, which includes FETs, transistors, coil formers and printed circuit board. No capacitors, resistors or crystal.

Basic Kit: $6.50, post paid.

Untuned output Kit: $8.50, post paid

P.C board with neutralising trimmer is available at $2.00, post paid

Overseas Magazine Review

"BREAK-IN"

January 1969

Our colleagues in the Amateur Radio magazine publishing business in the 'Shaky Isles' usually manage to produce a very readable magazine each month with something of interest for the majority of Amateurs.

In this issue are technical articles on a **"Low Power Transceiver for Eighty Metres,"** **S.s.b. using Integrated Circuits,"** by ZL4LV. This little transceiver is only 8½ in. wide, 3 in. high and 5¾ in. deep, power output is about half a watt.

The second technical article is **"Printed Circuit Board Design"** by ZL1HV.

(It is interesting to note the make-up of the different magazines and the quantity of technical material that they publish each month. The Editor has recently conducted a survey of the likes and dislikes of the readers of "A.R." and before undertaking this, he had a good look at the magazines coming into the Publications Committee's hands, most of them in exchange for copies of "A.R." each month. The content varies widely and so does the advertising.)

March 1969

Ed Marriner, W6ELZ, one of America's best known authors on Amateur matters, describes a **"Modified Automatic Keyer using Mercury Wetted Relays"**. According to the editorial comment, Ed. donated this article in exchange for many hours of pleasure gained from reading "B.I." The keyer is all solid state.

Bryan Savell, ZL2RI, contributed the next article titled **"80 Metre Transistorised Transceiver"**. He uses a low frequency filter with four crystals of the FT-241 type. Final transistor is a 40389, power input about half a watt. Complete circuit diagram is given if anyone is interested enough to want to build a similar unit and common transistor types are used.

The technical content is topped off by an article reprinted from Mullard Technical Communications on a solid state Electronic Aerial Switch, and ZL1HV then describes some RC circuits used to protect power diodes.

"CQ"

December 1968

The avid experimenters can dust off some of those old broadcast components they have been hoarding against the day of need—it is here in the shape of **"An Inexpensive Varactor Frequency Multiplier"** by W4YOT. This unit uses no fewer than six of those broadcast type variables, all two-gang. Three are 365 pF per section whilst the others are those so beloved of U.S. b.c. set makers which have dissimilar gangs so that they didn't need a padder.

W2EEY/1 discusses **"The Dual-Gate MOSFET"**. His summing up: 'Semi-conductor developments produce many items of only passing interest. The dual-gate MOSFET however, appears to be an item that is bound to have important and long term applications, particularly in receiver circuits.'

"Keeping the Volt Legal" is the next article by David P. Smith. Very few articles of this type have appeared in the Amateur literature perhaps because people believe there is little to be told. This article makes it quite plain that there is a great deal behind the definition of any of our electrical quantities.

W6ZWK then continues his **"Experiments with Three Arrays on One Beam."** Part 2 of the two-part article concludes with a discussion on isolation of the three arrays by line sections, isolation by networks, the effect on s.w.r., and the antenna patterns.

"A Continuous Motion Narrow Band Television System" is the title of the next article authored by Sid. Deutsch and Ray Simpson, WA2PYX. This is part 3 of a three-part series which described the principles and requirements of the slow scan t.v. transmitter and receiver. Part 3 provides the circuits necessary to construct the units.

Paul H. Lee, W3JM, continues his marathon **"Vertical Antennas"**. He describes several additional types in this, Part 7. Some of these can be adapted to Amateur use.

The last technical article in this issue is from the pen of W2AEF who offers **"More on Updated Improvements for 51J Receivers"**.

January 1969

For the benefit of those who are worried at the fact that reviews of "CQ" are running behind those of other magazines, the explanation is simply that "CQ" is arriving two months later than most of the others.

The January issue carries articles on the following. **"Variable Frequency Tuner for the Visible Light Band,"** Part 1 by W4AML. An earlier issue of 'CQ' discussed the semi-fictional story of space communication via light. The article aroused quite a lot of interest and so the author proceeded to "home-brew" a monochrometer and detector that could be duplicated by the average Amateur. Part 1 reviews the principles of light, the operation of the light detector and describes the construction of both photo-cell and photo-multiplier tube detectors. Part 2 will describe the construction of the monochrometer.

"A 160 Metre Linear," W8QJH/7. Using four type 6LQ6s as high mu triodes, not quite zero-bias. Input runs to about 300w. d.c. for 600w. peak.

"A Primer on Diode Amplifiers," W2EEY/1. Diodes up until recent years have been regarded primarily as devices for rectification and signal mixing. Besides their use as switching devices, they are also now used extensively for signal amplification and possess some unique advantages over conventional vacuum tube or transistor circuits used for the same purpose.

"Antenna Traps using Linear Capacitors," W1ILV. Uses one metre of RG58U cable to form a capacitor of about 80 pF to tune one of his traps and how to build a trap dipole for all bands, 80-10 mx.

"A Top Band Loop Antenna," W4UW. A loop antenna for receiving signals on 1.8 Mc. The main idea behind the design of this antenna is to improve the directional discrimination of the receiving system and so reduce interference from unwanted signals. An easily rotated receiving beam for 160.

"Vertical Antennas," W3JM. Part 4 dealing with directional arrays, aroused considerable interest. In this part the author discusses the design of a specific array and its feed system. This array is easily adaptable to multi-element switchable configurations for changing direction of transmission.

The rest of the issue is devoted to the usual "CQ" features.

February 1969

"AFSK FOR RTTY," W6FFC. The author describes a solid state r.t.t.y. converter for use on the Amateur bands.

"The W6 High Radio Frequency Short Beam," W6HRF. Compact end loaded two-element yagi for 20. Element lengths overall about 14 feet and spacing of 6 ft. 8 in. Truly a mini beam.

"A Simple Oscilloscope Calibrator," W6HDO. This small transistor unit provides the signals necessary for calibrating the usual uncalibrated Amateur class oscilloscope.

"T Notch Filter for the HBR," W6HHT. Selective rejection of unwanted heterodynes. Seems like a handy gadget to fit into the usual h.f. channel. This one operates on 100 Kc.

"Limited Space Antennas and Methods of Coupling," W1ICP. Lew tells you how to put the power where it will do the most good even though your antenna is not optimum.

"Bridge Break," W0ZJY. Describes an all electronic system for c.w. use.

"Transmitting Converter for 80 Me.," W8PMK. C.w. or s.s.b. on six with your h.f. exciter.

"A C.w. Clipper Filter using FETs," W7OWF. The title describes in detail what it is about.

"Automatic Letter Spacing for Ickey," by W1WCG. This article was promised in the Ickey article and tells how it is done.

"A Novel Antenna for 80 and 40 Metres," W1IR. Co-ax fed dual arrangement approx. 120 feet overall. Relay switched centre loading ensures low s.w.r. over whole band. Probably our narrower band okay.

"QST"

November 1968

"A Transceiving Converter for 160," W1CER. Doug describes a "Getter Downer" for those who wish to run a 6146 into a long piece of wire on "Top Band".

"Direct Conversion—A Neglected Technique," W7ZOI and W7WKR. This article could probably be retitled "Single Conversion Heterodyne Receiver" or "Direct from h.f. band to Audio". Shades of A9, M9, N9 and K5. Ex R.N. and R.A.N. operators will know what I mean.

"The 'Mobiloop'," W2OZH recipe. Take two mobile whips and add extensions to them so that they overlap by three or four inches above the centre of the top of your car and cover the lot with shield braid to increase conductivity. Fit tuning capacitors to resonate on 80 mx and, the author claims, you have a mobile antenna which is only about two "S" points worse than a full 132 ft. dipole. He states that it looks rather unconventional and I feel sure that if you were seen on the open highway with one some other motorists would indicate their amazement in no uncertain manner. Potential builders are referred to the article by ZL1AYN in "Break-In," May 1968, as his ideas may offer a simpler method of tuning.

"Absorptive Filter for TV Harmonics," by K0UVU and R. W. Carroll. Another method of ridding yourself of t.v.i.

"Ickey," W1WCG. As the name implies, this device is an electronic key using ICs. It uses quite a handful and has both dot and dash memories.

"Antipodal Reception of Oscar Signals," by K2QBW. This author discusses the reception possibilities of the "Oscar-Australis" satellite signals on 10 mx and postulates that it will be possible to read signals from this bird when it is behind mother Earth. [Most unlikely Australis will ever be launched.—Ed.]

"The Mainline FS-1 Secondary Frequency Standard," W6FFC. This small unit using a 4 Mc overtone oscillator in a special circuit provides outputs which are useable up to the 450 Mc band. All solid state.

"An R.F. Actuated C.W. Monitor," W1ICP describes a gadget which can be tapped onto your 50 ohm transmission line to pick off a bit of r.f. and use it to turn an oscillator on and off with the incoming signal. (It is powered by a battery—not the r.f.)

"The Square Rigger Mast," WB6QFE. Built from square section steel tubing 8 x 4 inches on a side respectively, this monster towers to 94 ft. in all its unguyed glory and is capable of being raised and lowered through a distance of about 35 ft.

"Break-In Key." With two old hacksaw blades and a little ingenuity, Harry K6ANY made himself a key which does more than just key the transmitter.

In the "Recent Equipment" section the Yaesu Musen FL-2000 Linear Amplifier is reviewed.

March 1969

"Phone Patching — Legitimately," W3NLT. The author discusses the various types of phone patch in use by Amateurs. The various types of telephone circuits and other details necessary for those who wish to phone patch, which, we understand, has recently become legitimate in the U.S.A.

"A CW Filter for the Collins 75S-1," WA4DID. The author cascades two FT-241 type crystals on 455 Kc. in two transistor stages using 2N706 or similar transistors to give his receiver a much narrower bandpass than that given by the 2.1 Kc s.s.b. filter. The author commends the filter to c.w. men.

"Integrated Circuits in the Keyboard Code Machine," W6OGZ. In this article the author describes a semiconductor shift register for the W2QYW Keyer described in "QST" for August 1963.

"The 'Mega Rule'," Phillip H. Smith. This article is about a slide rule type device designed to simplify calculation of reflection factors, s.w.r. and dissipation in antenna feedlines.

"A Band Spotter and W1AW Marker," by W1ICP. This simple unit uses a FET and a number of crystals which are switched from one frequency to another to put Amateur band markers in any one of six places that they may be required. It operates from its own 9-volt battery.

"A Medium Power Transmitting Converter for 144 Mc.," W8PMK. The 6146Bs are cooled by a small fan and operated with 600 volts on their plates; the converter requires about 3 watts drive on 28 Mc. and then gives out on 2 mx.

"Antennas for Travel Trailers and Campers," W1DBM. For those whose XYL will tolerate Amateur Radio on holidays, this looks like an interesting article, especially if you tote a 30 ft. "caravan" with you to the camp site. Philip S. Rand is well known for his exhaustive work some years ago on t.v.i.

"A Two Metre Transmatch with SWR Indicator," W1CER. Many s.w.r. indicators do not perform too well at these frequencies, this one is a modified "Moni-match" designed to perform at 144 Mc. and the rest of the gadget is designed to match the antenna to the transmitter and/or receiver. One advantage is the additional harmonic suppression.

"A Tiny Frequency Standard with Big Ideas," by W7EFV/W7MYH follows and the unit described is designed to provide check points at intervals as close as 5 Kc. apart.

The technical content is rounded out by the usual "QST" features, "H & K" a **"Receiver Offset Tuning Mod. for the Heathkit SB10"** and then VK2AOU completes the issue with a **"Triband One Loop Cubical Quad Element"**.

"RADIO COMMUNICATION"

January 1969

"G3ENL Mini-5 Receiver," G3RNL. Designed as a simple and cheap valve type receiver for s.s.b., etc., it uses modern miniature tubes and an i.f. of 5.2 Mc with v.f.o. on 9 Mc to tune 80 and 20 mx. By using a crystal oscillator and pre-mixer stage, the other bands between 1.8 and 30 Mc are covered.

"VHF SSB." Editorial discussion of the requirements for satisfactory operation of stations on s.s.b. at v.h.f.

Technical Topics. G3VA discusses first of all methods of preventing Amateur signals from entering t.v. sets to cause t.v.i. Apparently most British t.v. lookers use co-axial feed systems to their sets instead of the 300 ohm ribbon so common in Australia. Voltages induced into the outer braid from a nearby Amateur or commercial transmitter can quite often be rather high, causing all sorts of trouble with the picture. A double faraday screened coupling transformer is suggested as a possible cure. One version uses a ferrite core in the line transformer. In a later issue of "R.C." (February) another type of ferrite filter is also suggested as a remedy.

"Ideas in HF Receiver Design." Our old friends, Eddystone, have recently designed a special solid state receiver for the low power small ships maritime service. Some design features are discussed.

"Franklin Uniform Aerial." An old design is resurrected.

"3.5 Mc Mini-Antenna." A resume of the characteristics of a design by ZL1AYN in May 1968 'Break-In'.

"Modifying Receivers" is the next topic where he discusses various modifications which are possible for up-dating some of the older receivers such as the SX28, Super Pro. (and I suppose those old warhorses the B28) to make them suitable for s.s.b. work. The section concludes with short dissertations on a "New MOSIC or MOSFET Oscillator," "Loop and Aerial Arrays" and "Pressure from Broadcasters". The last article is an indication that Amateurs will have to fight very hard if they are to retain their present h.f. allocations for many years in the future. (The W.I.A. will accept all donations to the I.T.U. Fund.)

"Sky Hooks," GM3SIY. Author discusses the use of meteorological balloons of the type used to hoist radiosondes into the stratosphere.

"Adjustment of a Two Metre Converter," G3PKV. Author discusses method of adjusting converter so that minimum noise figure and maximum gain are achieved. Interesting for the v.h.f.ers.

"SSB and Interference," G3JGO. There has been an upsurge of articles on various aspects of t.v.i. in U.K. and U.S.A. in recent months. I have not been able to determine whether this is due to an increase of interference or just part of a plan to re-educate those who have forgotten the "Tennessee Valley Indians" or educate those who have never heard of them. One of the things that is pointed out in a number of publications is that each complaint appears to have a unique cure, which can be fully effective if the patient will co-operate and that the mere possession of a piece of commercial equipment is no guarantee that you will not offend someone.

February 1969

"The Wirral NFD Transmitter," G3CSG. A rig covering the bands from 160 metres to 10 metres. The final tube is a 2E26 with 250 volts on the plate. It is a c.w. only rig designed and built in the usual impeccable R.S.G.B. manner. Everything is conservatively rated and the final tank coils are wound on perspex tubing, 2 in. o.d., and probably capable of handling ten times the power out of the 2E26.

"The Snowflake Transistor Transmitter," by GW3DFF. Describes this as a cheap 144 Mc. transistor transmitter with reasonable power output for portable work. Using four Texas Instruments 2N2218 "Snowflake" transistors which the author purchased in U.K. for less than $1 each (Aust.).

Technical Topics. The regular Pat Hawker feature ranges over some more proposals for killing t.v.i., the new Eddystone solid state h.f. receiver, 10 Kc. to 30 Mc. in 100 Kc. steps. He makes the comment that this triple conversion receiver is unlikely to find its way into Amateur shacks in quantity. If it costs as much as it looks as though it does, I am not surprised. 'Direct Conversion," the article in Nov '68 'QST' is also commented upon.

"SHORT WAVE MAGAZINE"

January 1969

"Transceiver for the LF Bands," G3OGR. Using miniature tubes and some parts from such disposals items as the SCR522, the author comes up with a compact transmitter/receiver on a common chassis for 160 and 80 metres—in a case 10 x 7½ x 7 inches.

Followed by "More About Simplifying RTTY Control" (G3WGM).

"A Gated Dip Oscillator," G3SRY. Uses a FET for this job. Using the Colpitts circuit, this unit which uses an audio FET only covers 490 Kc. to 15 Mc.

The final technical article in this issue is titled "Fringe Area Harmonic Filters" by G. Ellis, G3LFZ, who deals with the methods he used to ensure that he could enjoy his Amateur Radio even though he was located in a fringe t.v. area.

February 1969

In this issue G3LFZ continues his dissertation on "Fringe Area Harmonic Filters." This is an interesting approach to the t.v.i. problems some Amateurs are encountering. In the system propounded a series of suitable harmonic filters are built across the transmission line so that the harmonics will not be radiated.

G3SRY follows with "Transmitter/Receiver in Solid State for Top Band."

This issue concludes with a short mention of "Integrated Crystal Filters" and what they can do. From this article it appears that GEC researchers have developed a filter which fits into an elongated style "D" can which is considerably better in characteristics than the older series using a number of discrete crystals. Their filter was centred on 10.7 Mc. and designed for a bandpass of about 12.5 Kc. Ultimate rejection of over 90 db. is achieved and the highest "pop-up" is down 90 db. A great deal of development is taking place in this field. Much of it is aimed at the "Mobile Radiotelephone" market, which, with its demands for more and more mobiles in narrow segments of the spectrum, are being plagued with a number of problems, many of these are to do with selectivity and I have seen where some companies are offering filters as high in frequency as about 210 Mc. so that a large part of the selectivity can be ahead of the first mixer.

"73" MAGAZINE

December 1968

"Using the First Ham Integrated Circuit," W8DNS. Includes several useful circuits.

"Mouse Tunnels," K6HKB. Describes how he hid the wiring in his shack and made it acceptable to his XYL.

"Circular Modulation Monitor," WA9IGU. Describes a monitor with a circular time base and radial deflection. When you have a bright spot in the centre you are overmodulating.

"The Mini-Square," WB6BIH. Square wave generator in miniature.

"Add On FM Test Set," K9STH. Simple to complex in easy stages.

"The Elusive E Parameter," WB6BIH. Not so elusive now. Perhaps an old thermionic valve-type like me can get converted.

"Zero Temperature Co-efficient VFO," by W8WQC. Sure stability.

"75 Metre DSB Rig," W2KBM. A step in the right direction.

"A Novice FET Converter," K6DBQ. A good building project for the novice.

"Transceiver Review" by the staff. Photos and information about the transceivers now available.

"30 Watt Transistor Transmitter," W5PAG. All transistorised. Modulated with the fingers operating an interrupter (key).

"Care and Feeding of a Ham Club." W2NQQ. Part 8 of the story.

"Christmas Gifts for Hams" by the staff. Present gifts under $US25.

"Three Black Boxes," W5EHC. What constitutes a station.

"Facsimile and the Radio Amateur," K6QKK. What is facsimile and how to do it.

"Why SSB," K3PUR. Required reading . . . how s.s.b. is different.

"Limitations on Antenna Reciprocity," by WA4UZM. The answer to one-way skip.

"Index to Articles Appearing in '73' in 1968" by the staff.

January 1969

"The Suppressor Compressor," W2KBM. The neglected grid.

"Putting the HW12 on 160 Metres," W8PGB. With the new rules, this is important.

"Tuning a Paradise Beam," W1EMV. This can really be fun.

"Does Your Linear Need Help?" W8VEY. This could solve the problems.

"Some Thoughts on Voltage Control," by VE4RE. A subject of some importance.

"Solid State Monitoring," W6JDD. A Heath modification of merit.

"The Two Metre Transistor Transmitter," K5WOR. Plus one tube.

"The Yaesu World Wide DX-Peditions." Starting with Danny.

"The LC Power Reducer," W1KKY/1. Power reductions under same load.

"Why RTTY," WA8DCE. Very interesting.

"Panadaptor/Spectrum Analyser," W6DTR. How to lose friends by being honest.

"The Six Net," W5JSN. Transistorised receiver.

"The Operating Console," W8GDP. A place for everything . . . , in its place.

"RTTY Auto-Start," W8ORG. Why monitor?

"Oscillator Frequency Shift Calculations," WA6DPD. Calculating drift.

"A Ten Minute Forty Metre Rig," WB2YOJ. On the air in a hurry.

"UFO Interest," K6MVH. Not restricted to Amateurs.

"Quick and Easy QRP," WB2YRQ. Low power can be fun.

"Full Sequential Switching," G3KPO. Using simple relays.

"Drake R4A and T4X," WB4EFA. Not new, but still great.

"Operating the Tweer," W6BLZ. Some hints for making it better.

"The S.O.B.," WA6SWD. Sightless operator's bridge.

"Getting Your Advanced Class License" by the staff. Part 10, last of this series.

"Care and Feeding of a Ham Club," W3NQQ. The last part.

"European VHF," DL3QN. They use the bands too.

February 1969

"A Fast Scan Vidicon is Slow Scan Camera," K7YZZ. More on s.s.t.v.

"A Cheap and Simple Linear Amplifier," WB2PTU. More watts per dollar.

"The Beatnote Basher," WB6JXU. A selective audio filter.

"The Unijunction Transistor, VK3ZRY. What they are and what they do. (Previously published in "A.R.")

"What's Out There?" W1EZT. Probing the universe for life.

"Velcro," K1AQH. A new material with Amateur [illegible]ential.

"TVI Suit," staff. Amateur sued for one million dollars.

"Nikola Tesla," Elkhorne. The master of electrical energy.

"Go Mobile," WB6ACM. Some pointers for new mobileers.

March 1969

The difference in format between the major Amateur magazines is quite remarkable. "CQ" and "QST" usually have four or five fairly lengthy articles on Amateur subjects and their usual features. "73" is quite different, especially where the technical content is concerned. In this magazine they specialise in the short snappy article and include a great variety of them to maintain the reader's interest.

"Modifying the TCS Transmitter," [illegible] discusses the modifying of one of the easiest pieces of surplus gear that one could wish to work on. Of simple straightforward design, the TCS covered 1.5 to 12 Mc. in three ranges and I have no doubt this could be changed to make it 1.8-14.5 or so if one were enthusiastic enough. Receiver was 7 tubes with r.f. stage.

"A 34 Compressor Pre-amplifier," W2EEY. More speech for less money.

"Resistance or Impedance," K2ZPZ and K2DRB. Answers to a lot of old questions.

"Weather Snooper," K2ZFV. Eavesdropping on the aircraft wx frequencies.

"The Charmin' Keyer," W2HXM. The solid state keyer.

"Amateur Radio Knows No Borders" by the staff. Saving a life across the Iron Curtain. Not technical, but interesting yarn.

"A Better Balanced Modulator," WA1FRJ. This intrigued me so I turned to page 36 to find that they do have some differences. The transformers are special and they even tell you how to make them.

"Adjustable Power Supply," WA0ABI. A must for building projects.

"Save Your Money" K6GKX describes his method of salvaging transformers.

"Transistor Oscillators," W2ZTK. A variety of circuits, old and new.

"Heath HW-18 Review" W6QUR reviews the 160 metre transceiver.

"Cool It," K8CNN. Blowers to cool tubes on u.h.f. Ideas will work at h.f. too.

"A New Support For That Beam." K1MYV describes a phone pole and a way of making the beam walk up and down.

"The Case for the Half Wave Feed Line," W3QRJ. Care and feeding of antennas.

"Putting Creativity to Work," VE3BUE. Making household articles work in the shack. Good tips for inveterate hoarders.

"The Lamb Dyer," WA1ABP. An amusing story about a new "old style one tube regenerative receiver".

"I.F. Alignment," K8ZHZ. Uses broadcast stations and their harmonics to accurately set the signal generator to the frequency required.

NEW CALL SIGNS

JANUARY 1969

VK1EM—E. J. Mulholland, 3 Oxley St., Griffith, 2603.
VK2BX—B. G. Warren, 142 King Georges Rd., Lakemba, 2195.
VK2NL—H J Freeman, 20 Nymboida St., South Coogee, 2034.
VK2SO—W. F Nobles, 5/12 Longworth Ave., Point Piper, 2027.
VK2BAW—G. P. Viertelhausen, 61 The Esplanade, Balmoral Beach, 2088.
VK2BAX—B. L. Nielsen, 14 Atchison St., Crows Nest, 2065.
VK2BCG—G. A. Cruickshank, 26 Killara Ave., Riverwood, 2210.
VK2BFA—J Farkas, 343 Shellharbour Rd., Barrack Heights, 2528.
VK2BHD—D. Hunsiker, 41 Church St., Maclean, 2463.
VK2BHL—H. H. Laauw, Lot 443, William Beach Rd., Dapto, 2530.
VK2BJJ—J P. Meehan, Station: Nicholsons Air Strip, Wee Waa, 2388; Postal: C/o. Nicholsons Air Services, Wee Waa, 2388.
VK2BMS—M. W Sinclair, 63 Ray Rd., Epping, 2121.
VK2BSG—S. G. D. Martin, 6 Freeman Ave., Oatley, 2223.
VK2BSH—H. Schroder, 396 West Botany St., Rockdale, 2216.
VK2ZLD—L. W. A. Doolan, 67 Fitzwilliam Rd., Toongabbie, 2146.
VK2ZNB—B. G. Morley, 65 Carey St., Toronto, 2283.
VK2ZTW—A. W. Wyatt, 1 Bareena Ave., Wahroonga, 2076.
VK2ZVA—R. W. J. Hazell, 14 David St., Moree, 2400.
VK2ZVR—R. V. A. Johnson, 2 Neville St., Rutherford, 2320.
VK2ZWH—I. C. McWhirter, "Haddon Park," Anembo Rd., Berowra, 2081.
VK3ET—J. A. Clark, Lot 87, Greenslopes Dr., Mooroolbark, 3138.
VK4KL—P. D. Cox, 15 Rosemount Rd., Nambour, 4560.
VK4SU—S. C. Armstrong. Station: Kennedy H'way, Kuranda, 4870; Postal: P.O. Box 14, Smithfield, 4870.
VK4VL—T. R. Cuttle, Cumming St., Bongaree, Bribie Island, 4507.
VK4WV—W van der Est, 148 Kenmore Rd., Fig Tree Pocket, 4069.
VK4ZJY—J R. Yarham, 85 Sims Rd., South Bundaberg, 4670.
VK5LP—E. C. Jamieson, Forreston, 5233.
VK5QV—I. E. Huser, 68 Ninth Ave., Joslin, 5070.
VK5US—R. G Atkin, C/o. 36 Symonds Cres., Modbury North, 5092.
VK5ZFF—M. Hanna, 2 Edgecumbe Pde., Blackwood, 5051.
VK6TD—T. Graham, 78 Grand Promenade, Inglewood, 6052.
VK6ZD—J. T Kelly-Hart, Flat 4, Squire Flats, Morris Rd., North Innaloo, 6018.
VK6ZK—T M. Stanicic, 20 Constance St., Mt. Yokine, 6060.
VK6ZGK—F. C. Kloppenburg, 11 Brown St., Carnarvon, 6701.
VK6ZJH/T—J. L. Harrison, 187 St. Brigid's Tce., Scarborough, 6019.
VK6ZKH—A. K. Hampel, Station Vernon Ave., Mundaring, 6073; Postal: P.O. Box 87, Mundaring, 6073.
VK7AX—A I. Bedelph, 11 Fulton St., Ulverstone, 7315.
VK7UX—C. D. Walker, 132 Granville St., Launceston, 7250.
VK7ZEK—W I. Hooke, 302 Nelson Rd., Mt. Nelson, 7007.
VK8BB—A. H. B. Brodrick, Hayes Creek Inn, Stuart H'way, via Darwin, 5791.
VK9AQ—N. A. Millar, Station, Lot 2, Section 3, Martrigogo. Hubert Murray H'way, Port Moresby, P Postal: C/o. P.O. Box 66, Port Moresby, P.

CANCELLATIONS

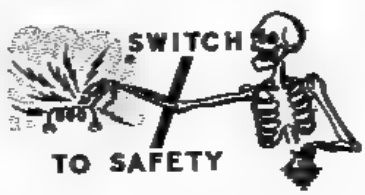
VK2GD—F. T Clark. Transferred to Victoria.
VK2IW—F. A. Borchard. Not renewed.
VK2AIF—1st Signal Regiment Army Wireless Club. Not renewed.
VK2AOG—M T Gabriel. Deceased.
VK2AQJ—K. B. Pounsett. Transferred to Qld.
VK2ASF—S. E. Fletcher. Not renewed.
VK2ATX—I. E. Huser. Ceased operation.
VK2BBB—The Stedfast Radio Club. Ceased operation.
VK2BHC—La Hermandad de la Costa Radio Club. Not renewed.
VK2BHF—H J Freeman. Now VK2NL.
VK2BUG—F D Voight. Not renewed.
VK2ZDR—G. A. Cruickshank. Now VK2BCG.
VK2ZOS—H Schroder. Now VK2BSH.
VK2ZQX—B. G. Warren. Now VK2BX.
VK2ZSO—S. G. Martin. Now VK2BSG.
VK3AVL—E. H. Connery. Transferred to W.A.
VK4ZAT—T. R. Cuttle. Now VK4VL.
VK4ZBU—W. van der Est. Now VK4WV.
VK5AV—E. J. Mulholland. Now VK1EM.
VK5AZ—B. E. Edwards. Not renewed.
VK5ZBF—R. G. Henderson. Transferred to A.C.T.
VK5ZEJ—E. C. Jamieson. Now VK5LP.
VK5ZJP—G. J. Perry. Not renewed.
VK5ZMH—I. W. Cowan. Transferred to Vic.
VK5ZPB—P. L. A. Burton. Not renewed.
VK6ZDA—J T. Kelly-Hart. Now VK6ZD.
VK6ZDT—T. M. Stanicic. Now VK6ZK.
VK6ZBJ—W R. Hines. Ceased operation.
VK7ZCW—C. D. Walker. Now VK7UX.
VK7ZXT—A. I. Bedelph. Now VK7AX.
VK8ZEB—E. S. Blackburn. Not renewed.

FEBRUARY 1969

VK1ZRH—R. G. Henderson, 12 Frost Pl., Page, 2614.
VK2OZ—A. R. Vanston, 34 Mulga Rd., Oatley, 2223.
VK2BFD—F. A. O'Donnell, 14 Edmondson Ave., Griffith, 2680.
VK2BIL—G. A. Pearse, 14 Macleay St., Greystanes, 2145.
VK2BJL—D. H. Mead, 22 Dowel St., Chatswood, 2067.
VK2BSA—Aust. Boy Scouts Assoc. (N.S.W. Branch), 265 George St., Sydney, 2000.
VK2ZKU—G. C. S. Jones, 3 Hillside Cres., Epping, 2121.
VK2ZLI—R. J. Langdon, 2 Clifton Ave., Glenbrook, 2773.
VK2ZME—M. E. Hood, 14 Crown St., Epping, 2121.
VK3FP—D. B. Sprow, C/o. The Sheraton Hotel, Spring St., Melbourne, 3000.
VK3JK—G. S. V. Frew, 13 Wellington St., Middle Brighton, 3186.
VK3AMM—A. C. Edwards, "Kuranda," 384 Glenferrie Rd., Malvern, 3144.
VK3AOX—C. W Crook, 107 St. Andrews St., Brighton, 3186.
VK3AVF—Melbourne University Astronautical Society, University of Melbourne, Parkville, 3052.
VK3AYX—B. P. Bailey, "Selworthy," 296 Mitcham Rd., Mitcham, 3132.
VK3ZWS—H. Grant, Flat 7, 16 Newlyn St., Caulfield, 3162.
VK4HV—R. J. Thorn, 349 Margaret St., Toowoomba, 4350.
VK4IN—J. D. MacLean, 69 Thorn St., Kangaroo Point, 4169.
VK5EB—C. J. McCarthy, 31 Yallum Tce., Kilkenny, 5009.
VK5ZGB—A. C. Wallace, 33 Edgeworth St., Prospect, 5082.
VK5ZIP—I. J. Champion, 14 Pedlar St., Seaton, 5023.
VK5ZIT—I. T. Croser, 42 Price Ave., Lower Mitcham, 5062.
VK5ZRM—R. W. McCarthy, 62 David Tce., Kilkenny, 5009.
VK6PW—F. W Beadle, 9 Pinaster St., Coolbinia, 6050.
VK6OR—Ockley Radio Club, C/o. J Ellis, Secretary, 112 Ensign St., Narrogin, 6312.
VK8VL—E. H. Connery, 5 Clapham St., Cannington, 6107.
VK8ZQR—W. R. McGhie, 120 Robert St., Como, 6152.

CANCELLATIONS

VK2ZI—A. L. Glasscock. Not renewed.
VK2ACY—C. J. McCarthy. Now VK5EB.
VK2AIQ—A. Cant. Not renewed.
VK2AQY—F. W. Beadle. Now VK6PW.
VK2ZU—F. A. O'Donnell. Now VK2BFD.
VK4BS—Toowoomba Guide and Scout Radio Club. Ceased operation.
VK4OK—J Makin. Ceased operation.
VK4WS—W J. Sebley. Deceased.
VK5EU—H. S. Young. Not renewed.
VK5NK—R. J. Knight. Deceased.
VK5ZGO—G. K. Oates. Not renewed.
VK5ZMM—M. J. Mitchell. Ceased operation.
VK6CP—C. R. Cooke. Ceased operation.
VK6GT—G. J. Bedwell. Ceased operation.
VK6HK—D. E. Graham. Transferred to Vic.
VK6RR—B. M. May. Not renewed.
VK6ZAY—W. Frost. Not renewed.
VK7BX—M. G. Hooper. Transferred Interstate.



Book Review

HAM RADIO INCENTIVE LICENSING GUIDE

By Bert Simon, W2UUN

Although we cannot imagine any market for this book in Australia, we went through it as a matter of interest. We have concluded that the standard required to obtain a licence in Australia is extremely high, or the standard in U.S.A. is on the low side. We are quite sure any Australian licensee would fly through the extra class test, the 20 w.p.m. code test being the hardest part. The history contained in the book has already been well covered by the monthly magazines coming from the States.

TAB Book No. 469. Price $US3.95.

ELECTRONICS REFERENCE DATA BOOK

By Norman H Crowhurst

An invaluable new reference containing the most often needed electronics data—clearly explains how to use electronics data in practical applications. This new book is much more than a simple collection of tables, formulas, graphs, equations, etc. In addition to the abundance of helpful information given, it provides specific guidance in the use of data. Numerous problems associated with every level of interest—from electronics theory (formulas, laws) to measurements, tests, and circuit design work—are covered. In so doing, the author explains how to use the data (from this or other volumes) for purposes other than those listed, and at the same time provides the help necessary to polish those "rusty spots" on certain fundamentals.

To facilitate the solution of problems involving a.c. voltages and currents, an entire chapter is devoted to applications of the "J" operator. As in all similar cases throughout the book, the author clearly explains how to apply vector analysis, using as examples the design of low-pass filters, a.c. bridges, sideband determination, etc. For more involved computations, another chapter contains exponential and trigonometric tables, plus data on the power series approach to waveform synthesis and analysis of asymmetrical rectangular waves. Other sections deal with attenuator, equaliser, and filter design, in which the author explains and illustrates how to design such devices.

An entire chapter is devoted to semiconductors (including FETs and ICs) and vacuum tubes, covering basic characteristics, operating parameters, gain calculations, applications, etc. Thorough treatment is given to the subject of feedback: purposes, distortion reduction, gain stabilisation, phase effects, and computation data. The final chapter deals with transmission lines, including a description of parallel and concentric conductors, waveguides, and matching devices. The accompanying tables list losses and loss vs. frequency for all principal cable types, impedance/conductor size and spacing, waveguide dimensions, and impedance for lines of various proportions.

Unlike most other data books, the information here will enable the reader to use data available from many other sources, also, it tells how he can develop additional data on his own. In every instance there are sufficient instructions on data development and application, showing why as well as how, to apply data.

There are over 100 illustrations, 232 pages, and 45 tables. TAB Book No. 488. Price: $US7.95 hardbound, $US4.95 paperbound.

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PROVISIONAL SUNSPOT NUMBERS

FEBRUARY 1969

Dependent on observations at Zurich Observatory and its stations in Locarno and Arosa.

Day	R	Day	R
1	93	15	70
2	98	16	87
3	96	17	104
4	96	18	101
5	94	19	126
6	101	20	142
7	122	21	169
8	101	22	213
9	108	23	208
10	85	24	201
11	74	25	198
12	84	26	196
13	55	27	162
14	54	28	158

Mean equals 120.9.
Smoothed Mean for July 1968 105.2.
Smoothed Mean for August 1968 104.0.
Swiss Federal Observatory, Zurich.

DX

Sub-Editor PETER NESBIT, VK3APN
32 The Grange, East Malvern, Vic., 3145
(All times in GMT)

ASSORTED

K6KA has mailed QSLs to all those who sent him a s.a.s.e for his FO8AA operation on 16th-21st February, 1968. Exceptions

(a) Those not sending postage. These will be handled last.
(b) Cards that must be researched in the log, because they bear incorrect GMT times and dates. There was a high percentage of errors in QSLs.
(c) Cards for dates other than the 16th to 21st February.
(d) Cards sent to FO8AA direct—these may be batched by FO8AA, and mailed back to K6KA at the latter's expense within a year. However, it would be preferable to send a new card via K6KA to be certain of a reply.

D.X.C.C. credit will be given to Israeli stations operating within the Israel boundaries as they existed at June 8, 1967. In other words, there is no D.X.C.C. credit for 4X8 contacts.

Some time ago a licence was issued for operation of an Amateur station on Rockall Island by the G licence bureau, with a GM call being assigned. At the time it was assumed that any Rockall operation would count as Scotland. Since then, a review conducted by the A.R.R.L. Awards Committee uncovered the possibility that since Rockall Island is not part of Scotland it might receive separate credit—issuance of a GM call did not result in the Island becoming Scottish Territory.

SK9WL was operated on April 12-13 from the 'Free State of Morokulla". Operators were SM5CZY, 5EAC, 5FC, 7CRW, 7DQC. Morokulla is on the LA/SM border; as yet its country status is not clear. QSL via SM7CRW (address below) enclosing three IRCs for return via the bureau, four IRCs for return via surface mail; or five IRCs for reply via airmail. Three of the IRCs sent will be used for donations to several Charity Funds.

LG5LG, also operating from Morokulla, has a similar QSL procedure: 3, 4, or 5 IRCs for bureau, surface, or airmail replies respectively. The QSL manager is LA4YF, and his address is also given below.

Herb KV4FZ regularly makes short trips (usually Thursday/Friday) to other Caribbean spots. Frequencies to watch are 1826, 3501, and 7001 Kc. As VP2KK, Herb became W1BB's 104th country on 160 mx.

Marco Island. Two operators were said to have operated on Marco Island off Peru using the call sign 3K2A around mid-April???

HL9KQ skeds K4VGI daily 14240 s.s.b. at 1200z, also QRV 21050 c.w. at 2115/2215z. John will make week-day or week-end skeds for any band, c.w. or s.s.b. He will go QRT in mid-June.

C2A-C2Z is the new call sign allocation by the I.T.U. to Nauru (formerly VK9).

It has been suggested that DXers write to the Commandant of the U.S. Coast Guard expressing appreciation for the Coast Guard's help in putting VK0WR on the air from Heard Island, and request that U.S.C.G. operators may be permitted to operate from KC4, Navassar Island. Write to: The Commandant, United States Coast Guard, 1300 East Street N.W. Washington, D.C. 20591.

PQ, PR, PS, PT and PU: About 100 PY stations were allowed to use these prefixes in place of "PY" for the WPX S.s.b. Contest. Some operators were able to add two dozen or more new prefixes to their prefix score!

Carlo 7G1CG has been active on 21 Mc. Is this station legitimate? QSLs have been received via WA3HUP but why is registered mail sent to the direct QTH given by Carlo (Box 33, Conakry) returned to the sender marked "Inconnu"?

April "A.R." carried a report that the Victorian airport stations ML and LAV were prefix anomalies. Just to set the record straight, they are Aeronautical Navigation Identifiers, not true call signs, therefore they are not prefix anomalies. (Thx L3042)

Pacific DX Net. This very efficient net is run by Ed de Young KH6GLU and gives the latest DX information on Fridays 14240 Kc. at 0700z. Anyone may join in.

When obtaining QSL cards from rare stations, it helps considerably if IRCs are included with the card. It helps still more if stamps are included instead (s.a.s.e.). The obstacle is getting the stamp of the DX country. W2SAW operates a stamp service, and stocks unused stamps of most countries. Further information may be obtained from the man himself, W2SAW, S. Ringler, DX Stamp Service, 466 Weaver Road, Webster, New York, U.S.A. 14580.

160 metres does have DX possibilities . . . VK5KO reports that over the past few years, he has chalked up over a hundred different W/VE stations on 160.

W4BPD DX-pedition: Gus has announced frequency changes. The new frequencies are: 21348 s.s.b., listening 21300 up, 7015-7025 c.w.; and a few kilocycles above or below 3520. All other frequencies remain the same, refer to April "A.R." page 18. This DX-pedition is certainly putting a few rare countries on air. The trouble is that he moves from place to place so quickly, and rarely gives hints as to where/when his next stop will be, so it takes a very active and alert operator to follow his movements. Personally, I feel that this is being unfair to the majority of Amateurs (like me) who don't have the time to sit tuning for him all day, and conflicts with his earlier statement that he would make the art of DXing "as lively as it was a few years ago".

Another new country? The A.R.R.L. has been asked if the "Kingdom of Lundy", which was written up in "The National Observer," March 31, 1969, will qualify. Lundy is a tiny island in the Bristo Channel off Britain's Southwest coast which has been independent for centuries. I wonder if the people of Lundy suspect that soon, they might be invaded by hoardes of Radio Amateurs, each one trying to be the first on air?

NEW DX SUB-EDITOR

These notes are the last to be supplied by Peter Nesbit VK3APN, who has had to relinquish his task due to pressure of business.

As from the July issue, DX Notes will be supplied by Don Grantley, whose address is P.O. Box 222, Penrith, N.S.W., 2750, to whom all DX information should be sent.

The Publications Committee extends thanks to Peter Nesbit for his assistance during the last year.

4K1ITU is a rare call used by Swiss Amateurs when they are working in I.T.U. on International Callbook compilations.

For the benefit of any VKs who are contemplating DX-peditions, it is necessary for them to submit to the A.R.R.L. proof of authority to operate, as well as proof of presence.

Dick GC6HT will be active on the following dates and frequencies: 1973 Kc s.s.b. 1800z June 30, 7043 Kc c.w. at 0630z June 2, 7063 Kc s.s.b at 1800z June 3; 14043 c.w. at 0900z June 9; 14343 s.s.b. at 0730z 9th; 21013 c.w. at 0730z 16th; 21343 s.s.b. at 0900z 16th; and 28013 c.w. at 0730z 23rd. Here is a good chance to pick up Guernsey on a few bands.

QSL MANAGERS

CR6CA—VE3GNM
EL2J—WB2WOU
ET2DA—W2MXB
F9UC/FC—DL9PF
FO8BW—W6JFM
GD5UW—W2GHK
HC8FN—WA2WUV
HL9KQ—W4YWX
KC6CS—W7BUB
KC6CT—W9VW
KG6SM—W2CTN
MP4TCR—R.S.G.B.
OE2ZON—W6IMZ
PA9IF—W6IMZ
PJ6AA—KV4AM
VK9WD—W2CTN
VP2KF—VE3DLC
VP2KM—VE3EUU
VP2LA—VE3EUU
VP2MF—VE3GCO
VP2SO—WB2WOU
VR1L—W6NJU
VR1Q—ZL2AFZ
VR2DI—VE6TK
VS6DR—W3CTN
ZF1AR—W6ROF
ZF1FT—WB4BND
ZF1GC—VE4XN
ZF1KV—WA0QOI
ZF1RD—K4LSG
3V8AC—W4ROF
3V8AD—DL1DA
4X4CY—WB2WOU
4X4QL—WB2WOU
4X4SK—WB2WOU
4X4SO—WB2WOU
4X4UL—WB2WOU
4X4WL—WB2WOU
4X4WP—WB2WOU
4Z4AQ—WB2WOU
4Z4HF—WB2WOU
4Z4HQ—WB2WOU
6Y5GB—VE3DLC
9H1BL—G3VPS
9H1BN—W2CTN
9N1MM—W3KVQ
CP1GN—C/o. U.S. Embassy, La Paz, Bolivia.
FB8XX—Prior 6/1/69: FR7ZD
FB8XX—Since 6/1/69: F2MO
FB8ZZ—Since 1/1/69: F8US.
GC8HT—R. Taylor, La Cour de Longue, St. Saviours, Guernsey, Channel Islands.
LG5LG—LA4YF, Hans Kinck, 3800 Bø i Telemark, Norway
SK9WL—SM7CRW, John Iwar Winbladh, Box 24, 560 12 Waggeryd, Sweden.
VK3LB—via Berry Research, Box 287, Norfolk Island.
9J2XZ—via WA9PRE/2, 5 Pennypacker Drive, Willingboro, N.J. 08046, U.S.A.

ACTIVITIES

Hello again to Jack VK3AXQ, who is still busy on 20 mx c.w., apparently having quite a bit of fun. Although handicapped by a dipole which is end on to Europe, he has managed to work a few Europeans, among others. He has been hearing: Owen VR2DK, who vanishes as quickly as he appears, YJ8JM, buried deep under a dogpile, ZF1KV, on a vacation to Cayman Isl., being ruthlessly called by stations left, right and centre, HL9UU, who is usually swamped by JAs calling CQ DX on top of him. John says that 20 mx conditions are still holding up, although QRM is grim at times. VKs are still conspicious by their absence. (Thanks John—Peter.)

George L6042 is still keeping an ever-watchful eye on 160 mx. He reports conditions as below par, although on March 16 K1PBW/8, W5HW and W9PNE were coming through, and on April 4 K9YWO showed up briefly on 1805 Kc. Since then not much has been heard. (Thanks George—Peter.)

SUMMARY

Many thanks to this month's contributors: DX News, LIDXA, ZL2AFZ, VK3AXQ, VK-3AUT, L3043, and last but not least, L6042. Please keep the news coming fellas, remember the deadline for news is the 1st of each month. Meanwhile, good DX hunting. 73, Peter.

— . . . —

AUSTRALIAN RESULTS OF 9th ALL ASIAN DX CONTEST (1968)

Call	Band	Score
VK3GW	M	1690 points
VK3AXK*	28 Mc.	70 points
VK3RJ	28 Mc.	10 points
VK3QV	28 Mc.	9 points
VK3APJ*	21 Mc.	978 points
VK4CK	21 Mc.	584 points
VK3KS	21 Mc.	486 points
VK2APK*	14 Mc.	1793 points
VK4SS*	7 Mc.	102 points

* Oceania Leader—single band.

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PROVISIONAL SUNSPOT NUMBERS

JANUARY 1969

Dependent on observation at Zurich Observatory and its stations in Locarno and Arosa.

Day	R	Day	R
1	66	16	118
2	75	17	100
3	72	18	85
4	98	19	73
5	117	20	76
6	135	21	65
7	140	22	105
8	150	23	88
9	132	24	105
10	134	25	102
11	138	26	99
12	137	27	78
13	124	28	79
14	119	29	82
15	116	30	80
		31	95

Mean equals 104.5.
Smoothed Mean for July 1968, 105.0.
—Swiss Federal Observatory, Zurich.

VHF

Sub-Editor: CYRIL MAUDE, VK3ZCK
2 Clarendon St., Avondale Heights, Vic., 3034

TO THE MOON AND BACK

A Journey into Space and Back by John ZL1AZR and Kjell SM7BAE

Readers of May 1969 "A.R." will have read of the new two metre moon-bounce record of John ZL1AZR and Kjell SM7BAE, this short article tells how it was achieved.

John ZL1AZR arranged skeds with Kjell SM7BAE during the latter half of Feb. '69, but proved a little difficult because of the very short overlap of mutual moon visibility. However, suitable times were worked out and frequencies and other details finalised. The frequencies decided upon were 144.0030 Mc. and that the antennas would have to be pointed to within 2 degrees of the moon.

"On our first sked on 3rd March we heard each other at a just detectable level, the next day at 1728 G.M.T. call signs were partially copied and at 1746 G.M.T. signals peaked to 12-15 db. above the noise and in the next few minutes call signs and signal reports exchanged to comply with the accepted standards required to constitute a QSO.

"The total useful period was about eight minutes, the moon's elevation was 9 degrees, and we think that the extra 3-6 db. ground reflection gain due to low angle radiation greatly assisted."

The equipment used is as follows:—

SM7BAE: 1500w. to a 4CX250R and 16 ten element yagis, and a 2N4416 mast head preamp. to the receiver.

ZL1AZR: Zero bias class B 4/400 in push pull running linear with an output power of 550-600 watts, and the antenna eight bays of 6/6 slot fed yagis. The receiver used a DIGFET mast head pre-amp. into a converter and a tunable i.f. of 14 Mc and a bandwidth of about a couple of hundred cycles.

"A point worth mentioning is that a further series of skeds on 22nd, 23rd and 24th March were ruined by very strong over modulated local signals (could very well apply in Melbourne—Sub-Editor) and as most moon-bounce activity is below 144.010 I would like to see the V.h.f. Groups press for a N.Z. wide restriction on this tiny segment of two metres."

The signal report system used was a code containing the letters "T", "M" and "O", and the number "5". This system was used because of the vertual impossibility of copying dots except when conditions are very good.

"T" means weak signals present.
"M" means partial call signs copied.
"O" means both call signs and signal report copied.
"5" means almost perfect copy, thus allowing dots to be used.

For the purpose of a contact to be claimed, signals of an "O" level are considered adequate by overseas M.B. groups. The distance involved was 11,370 miles around the earth's surface compared with Ray VK3ATN's 10,417 miles.

"In conclusion it only remains to say that there is no easy way with moon-bounce. Anyone deciding to have a try must be prepared to stop being a communicator and, as our Amateur licence states 'become an experimenter'."
73, John ZL1AZR.

Reprinted after being precied from "Spectrum" the journal of the Auckland V.h.f. Group, New Zealand.

OBITUARY

GEORGE BATY, VK3AOM

George Baty, VK3AOM, died suddenly on Sunday, 13th April, 1969, at the age of 76 years.

As Secretary to the Publications Committee, George was well known to all correspondents by his precise letters, either in his flowing hand writing or knocked out on his trusty old typewriter.

George joined the Publications Committee early in 1957 and completed his last task for "A.R." the day before he died by posting back the corrected proofs for the May issue.

Although his interest in radio went back to the 1920s, George did not take out a licence until his son Ray was posted to Fanning Island in 1954 and operated under the call of VR3A.

During his last year as Headmaster of the Sunshine State School, George spent all his spare time with a copy of the A.R.R.L. Handbook and with his carefully prepared volume of questions and answers. At an age of 68, George passed the full A.O.C.P., surely an example to the many who consider themselves too old to tackle the examination.

George was always quick to admit that he was not a "technical type". However, he constructed a 100 watt all band phone transmitter that would have been a credit to any Amateur. On 80 metres, George's signal was well known around the world and in particular to his many friends in the United States.

With the decline of a.m. on 20 and also a difficult case of t.v.i., George was relatively inactive from 1962 until early 1967 when he acquired a small sideband transceiver. Although only running around 100 watts p.e.p., he took up from where he had left off with the old a.m. gear.

Only a month before his death he received his "Worked All Pacific" award and had also qualified for the U.S. "Worked All States" award. Sadly he missed gaining D.X.C.C. by only two countries.

On 40 metres he was regular in the lunch time nets and was known to all listeners with his daily contacts with his son Ray, now VK2ANB, and living in Sydney.

Apart from Amateur Radio, he had many interests in life. He was a member of the Bundera Road, Methodist Church, where he sang in the choir for many years.

George's garden was always his pride and joy, and was surely one of the neatest in the district.

It is perhaps fitting that his last contact on the air was with his son Ray on the morning he died.

George's passing leaves a gap that will be hard to fill. He enjoyed and served his hobby well.

We extend our sincere sympathy to George's widow, Gladys, to his son Ray, and daughter-in-law Joan, and to his grand children.

Vale George.

INFORMATION FROM DIVISIONS

Well it is v.h.f. news time again, there is not very much to report, but I have had requests from time to time for the following:
(1) Dates of Divisional and V.h.f. meetings.
(2) The main 6 and 2 metre net frequencies in use.

As this information can only be supplied by the Divisions concerned, it would be appreciated if the officers responsible in each State could let me have it at their earliest convenience, as there are many Amateurs travelling Interstate these days who would like to meet fellow Amateurs on their trips.

Hoping for copy for this column from all Divisions in the very near future, 73, Cyril VK3ZCK.

V.H.F. REPEATERS/TRANSLATORS

The following two metre repeaters/translators have been planned for VK3:—

Channel 1—Melbourne.
Channel 4—Traralgon and Geelong.

The two Channel 4 listed have their units in an advanced state of construction and are applying for P.M.G. licences.

Other known systems in or about to come into operation shortly are: Sydney Channel 4, Newcastle Channel 4, Orange Channel 1, Wagga and Wollongong Channel 1, Albury Channel 1.

Northern Tasmania, Mt. Barrow, Channel 4.

To use these repeaters/translators, mobiles should TRANSMIT on the following frequencies —

Channel 1 — 146.10 Mc.
Channel 2 — 146.20 Mc.
Channel 3 — 146.30 Mc.
Channel 4 — 146.40 Mc.

Mobiles will then RECEIVE on:—

Channel 1 — 145.60 Mc.
Channel 2 — 145.70 Mc.
Channel 3 — 145.80 Mc.
Channel 4 — 145.90 Mc.

This information was gleaned from "E.A." and Divisional Newsletters.

Information regarding the installation and allocation of frequencies can be obtained from Divisional Headquarters in each State.

In VK2 apply to V.h.f. Repeater Committee, Wireless Institute Centre, 14 Atchison Street, Crows Nest, N.S.W. 2065.

In VK3 apply to V.h.f. Repeater Committee, Wireless Institute of Australia, Victorian Division, P.O. Box 36, East Melbourne, Vic., 3002.

SILENT KEY

It is with deep regret that we record the passing of the following Amateurs —

VK3AJQ—J. R. Kling
VK3ZAD—R. Bowen.

VICTORIA

As usual for this time of the year a large amount of constructional activity is under way in preparation for next season. U.h.f. equipment seems to be the main undertaking along with the usual beam repairs and other modifications.

Late April provided VK3s with an exceptionally long opening lasting almost a week and covering all parts of the State.

Country stations worked included VKs 3ATN, 3ZMS, 3AJX, 3AJM, 3ZFS, 3AXV, 3ZXI, 3HP/3, and the Interstate VKs 5BC, 5ZDY and 2RS. Signals from the Orange district f.m. translator station on Mt. Canopolis were heard in Bendigo and some QSOs were made from Geelong to the Orange district via the translator. Ray VK3ATN QSO'd several local stations on 432 Mc.

The VK3 Beacon Group has had an offer of a site in Oakleigh for proposed 144 and 432 Mc. beacons. If anyone has any constructive suggestions or comments to make regarding this matter could they get in touch with Peter VK3ZYO.

1296 Mc.—Currently three Melbourne stations and one Northern Tasmanian station are engaged in constructing gear for this band. It may be possible that some time in the near future we will see the first VK7/VK3 QSO on this band and perhaps a new Australian record.

Allan VK3ZHU and Ian VK3ALZ have worked each other over a distance of 50 miles from Mt. Buninyong where Allan was operating portable, and Glenroy, Ian's home QTH. This contact is as yet an unconfirmed VK3 record. 73, Peter VK3ZYO.

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. Position in the list is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total D.X.C.C. credits given, including deleted countries. Where totals are the same, listings will be alphabetical by call sign.

Credits for new members and those whose totals have been amended are also shown.

PHONE

VK3MS	317/340	VK5AB	290/314
VK3AHO	312/326	VK4FJ	285/304
VK5RU	311/336	VK4KS	283/298
VK4HR	307/325	VK4TY	275/278
VK3JZ	305/322	VK3APK	272/277
VK5MK	304/323	VK3TL	271/277

New Members:

Cert. No. 96—VK3IP 123/122
Cert. No. 97—VK3SX 129/132

Amendments

VK3ZE	217/230	VK4PX	201/202
VK4DO	216/225	VK5JW	175/176

C.W.

VK3QL	300/322	VK3YL	270/287
VK3AHQ	292/306	VK3ARX	268/277
VK4FJ	290/314	VK3APK	265/274
VK3CX	289/312	VK5RU	266/289
VK2AGH	282/296	VK3NC	264/277
VK4HR	279/302	VK3XB	264/277

Amendment:

VK4DO 187/204

DUEL

VK4HR	312/336	VK4TY	301/315
VK5RU	312/337	VK4FJ	296/322
VK2AGH	311/331	VK3ARX	290/299
VK2VN	306/323	VK2APK	289/299
VK5MK	305/324	VK3TL	287/293
VK3EO	302/325	VK3XB	286/274

Amendments:

VK4KS	284/303	VK4PX	231/226
VK4DO	236/254	VK3SX	138/141

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

A.T.V LONG DISTANCE RECORD

Editor "A.R." Dear Sir,

I wish to apply for the attainment of an Amateur Television long-distance record of 93 miles, established by Ray Foxwell, VK5ZEF/T, and Maitland Lane, VK5AO/T.

The exercise was carried out on 16th February 1969, between Willunga Hill and South Hummocks. Video with inter carrier sound was successfully transmitted on the 433 Mc. band both ways.

—M. J. Lane.

This is the first claim to be received for a record involving television transmissions and as such VK5ZEF/T and VK5AO/T are to be congratulated on achieving such a fine performance. The original claim will be kept on file and if sufficient interest is shown and other claims received then such claims can be included in the VHF/UHF Records Box that appear in "Amateur Radio" from time to time.—D. H. Rankin, VK3QV, Federal Executive, W.I.A.)

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FEDERAL AWARDS

CHANGE OF ADDRESS TO WHICH APPLICATIONS FOR AWARDS ARE TO BE SENT

In future all applications for Awards, enquiries, etc., should be addressed to —

Federal Awards Manager, W.I.A.
P.O. Box 67,
East Melbourne, Vic., 3002.
Australia.

No further applications should be sent to Box 3611W, G.P.O. Melbourne.

"ELECTRONICS AUSTRALIA" AMATEUR BAND NEWS AND NOTES

Amateurs are advised that recently the Australian DX Century Club Award and the Australian VHF Century Club Award have received publicity in "E.A." under the Amateur Band News and Notes section by VK3APQ. The articles appeared in December 1968 p. 156-157 and April 1969 p. 155.

As neither of these articles was authorised by the Federal Awards Manager W.I.A., no responsibility can be taken for the accuracy of the information given. Any inconvenience caused to Amateurs by the publication of incorrect information is regretted and it is hoped that in future no material will be published relating to Federal Awards without the prior approval of the Federal Awards Manager.

—Geoff Wilson, VK3AMK, Manager.

CHANGE OF ADDRESS

W.I.A. members are requested to promptly notify any change of address to their Divisional Secretary —not direct to "Amateur Radio."

FEDERAL QSL BUREAU

The composition of the team which successfully concluded the recent DX-pedition to Malpelo Island was as follows: Dale W4DQS, Enos W4VPD, Bill HK3RQ, Bob W0DX, Jose HK5BFJ, Gab HK3HY, Carlos HK3VA, Pacho HK3BAS, Carlos HK5EV, Luis HK5ACI, Enrique HK5ASP and Don K6JGS/HK3. The trip was full of incident and the landing extremely difficult. After a lot of urging by Enos W4VPD, it was decided to manhandle the gear up to the plateau, 350 ft. above sealevel. This move paid big dividends and gave HK0TU a clear take off both paths to most areas. Enos is not happy with the attitude of many VK stations who ignored his requests for assistance in contacting VK0WR, then on Heard Island. After giving most VK stations a new country, their reluctance to assist him similarly has left a bitter taste in Enos' mouth.

VK2AGO, H. G. Wilson, of 31 Glenview St., Greenwich, N.S.W., 2065, advises he is the QSL manager for VK9RY. All cards should go direct to above address or via VK2 Bureau.

Alan Brown, VK3CX, kindly supplies details of the ceremony surrounding the closing down of the last Morse circuit in the Victorian Railways on 3rd March last. The circuit was to Mildura.

Don Shaw, VK3PV/VK6PV, of O.T.C. Rockbank, supplies details of the proposed visit to VK towards end of June by Cliff Nelson, W1IDA, of Goreham Maine. Cliff, accompanied by his XYL, will spend his Sabbatical year in Cardiology research at the Royal Melbourne Hospital. He proposes to bring a rig with him if space permits and anticipates seeing as much of VK as he can fit in. He has expressed the wish to meet up with the VK gang. Don expected he would be able to meet the Nelsons on their arrival, but the O.T.C. have now decided to completely close down the Rockbank and Fiskville stations and Don expects he will be transferred away from Victoria. Don states that any invitations and courtesies extended to the Nelsons will be personally appreciated.

Pierre Gallier, REF15906, of Bat X Vieux-Fort 94, Vincennes, France, who I mentioned in this column some months ago, again complains of his inability to secure QSLs from VK stations. As at 1st April, he had received only five replies from 30 reports sent out. Whatever your feelings as regards unsolicited s.w.l. reports, it is discourteous and dishonest to ignore the enclosed I.R.C. If too lousy or lazy to write out a reply card, it is easy to endorse confirmation on the s.w.l. card and return it to sender. According to the complainant, the following VK stations have not replied to his reports with I.R.C. enclosed: 1KB, 2AGP, 2AMD, 3AKA, 3AD, 3OD, 4NN, 4TW, 4KS (2), 5GG, 6RU, 6PZ.

Results of the Danish OZ-CCA Contest for 1968 does not list a single VK station. The 1969 Contest was held on 3rd and 4th May, 1969. Logs should be sent to Contest Committee, P.O. Box 335, Aalborg, Denmark.

Congratulations to Al Manwaring, VK3QK, of Cootamundra, on surviving major abdominal surgery at the Wagga base hospital in early March. As of 19th April, Al advises he is slowly getting into shape again and may resume light work very soon. He also hopes to resume his daily 7 Mc. c.w. sked with VK2YL.

The annual CHC QSO Party is set down for 23z Friday, 6th June, to 08z Monday, 9th June, 1969. Any Amateur may participate. Full details may be had from this Bureau.

Ray Jones, VK3RJ, Manager.

HAMADS

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Extra words, 3 cents each.

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BENDIX Frequency Meters: BC221 with in-built AC/DC power supply. In original sealed cartons and complete with charts, manual, headphones, cords and spare valves. Limited quantity. $70 cash with order. Advise shipping instructions. G. B. Lance, 123 Webster St., Ballarat, Vic., 3350.

BUY SSB Transceiver. Require commercially made unit similar to Yaesu FT50 or Eico 753. Please state make, model, condition and modifications. Best offer to T. Moore, 23 McGuinness Cr., Lenah Valley, Tas., 7008.

FOR SALE: AR7 Receiver, complete with power supply and speaker, co, boxes B, C, D and expanded E, $60. VK3ABP 6 metre Converter, complete xtal and power supply, $10. L3324, 18 Princes Highway, Trafalgar, Vic., 3824.

FOR SALE: BC221 Freq. Meter, good condition, req. pwr. supply, $55. National Comm. Rx NC33, 540 Kc. to 30 Mc., 7 valves, S meter, suit beginner, $45. Heathkit Transistor Radio Navigator, $40. VK5OO, 2 Claring Sould Rd., Christies Beach, S.A.

FOR SALE: Complete Power Supply 2000v. 300 mA. 5v. 13a., —100v. 0.3a. Fully fused and overload protected. Commercially built. Ex FMB 4000 base station. Also spare 2000v. transformer for above. N. Stewart, 131 Bradfield Rd., West Lindfield, N.S.W. 2070. Phone 46-3299.

FOR SALE: FT50 5-band a.m.b. Transceiver and v.f.o., complete $300. VK3AUN, 171 Chandler Rd., Keon Park, Vic., 3078. Ring Melb. 46-4300 after 6 p.m.

FOR SALE: Galaxy V. Transceiver with power supply and vox. $425. Commercial, SWR Bridge $12. HRO Receiver (9 coil boxes), $40. BC348 Receiver, $40. 2 mx Tunable Converter, $8. MCR1 Receiver, $3. R. N. Ferguson, 23 Floral Ave. East, Mildura, Vic., 3500. VK3AGF.

FOR SALE: Harvey-Wells Bandmaster de luxe Type TBS-50D. Covers all bands 3.5 to 144 Mc. with single band change switch and built in VFO or xtal control. 40 watts input on a.m. phone or c.w. into pi-coupler output. Home-brew regulated power supply for above. Compact black crackle finish cabinet in excellent condx with original handbook. Suit newly licensed Ham or mobile opr. $125. R. S. Monfries, VK5RB, 975 Main Rd., Modbury, S.A. (phone 64-2317).

FOR SALE: Heathkit SB-101 Transceiver, as new complete with HP-23E 230-110 volt a.c. power supply and HP-13 12 volt d.c. power supply, $565. C.w. filter, $20. E. Panikis, 6/11 Northbourne Flats, Canberra City, A.C.T. 2601.

FOR SALE: Pye Mk. IV. Carphone, 6BW6 final, relay mute, trans. p.s., complete with xtals and operating 53.032 net, $40. 20 metre full size three element beam, gamma matched, good s.w.r., inspection invited $40, o.n.o. Mike Trickett VK-3ASC, 3 Matlock St., Herne Hill, Geelong, Vic., 3218. Phone 71866.

FOR SALE: Receiver Drake 2A with step-down transformer and loudspeaker. $170 or offer. O. Saas, VK2SI 12 Russell Ave. Speers Point, N.S.W., 2284. Tel. 58-1996.

FOR SALE: Yaesu Musen FL200B transmitter, condition as new, with microphone. $295. D. Johns, VK3AZJ 15 Rowell St., Rosanna, Vic., 3084. Phone (business hours) 82-9338.

FOR SALE: 1 Palec Mode VCT-2 Valve Tester with built-in Multimeter, $20. 1 Philips 2 in. CRO Type TA155, needs some attention, $20. Will sell or exchange for 6 or 2 mx transceiver in working order. G. Feila, 8 Hilton St., Glenroy, Vic., 3046. VK3ZZV.

FOR SALE: 70 ft. Telescopic Tower galvanised three sections with pipe extension. On rail at Kyabram. $65. VK3AHO, Bill Hempel, 7 James Street, Kyabram, Vic. Tel., Kyabram 522194.

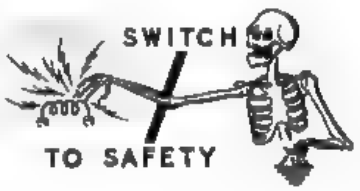
FOR SALE: 100 Tx/Rx 2.5-5 Mc. with a.c. power pack, mike and speaker. $30 or offer. Gilco Type R.P. 12 volt d.c. to 240 volt a.c. Rotary Converter, $20 or offer. C. Richardson, 45 Dimboola Road, Horsham, Vic., 3400.

SELL: 20 mx SSB Transmitter and Receiver, power supplies, complete with spare tubes, best offer. Wanted: FT50 or similar SSB Transceiver in good working condition. Price and particulars to VK3APP, Apprentice Squadron, R.A.A.F., Laverton, Vic., 3027.

WANTED: Collins 51J-1-2-3 or 51J4 receiver, 51J2 preferred. Must be clean, electrical condition secondary. Similar style receiver such as Racal considered. Price and details to VK3IB, Box 35, Dimboola, Vic., 3414.

WANTED TO BUY: Shielded Receiver with external antenna connection capable of tuning 1500 Kc. for use with 2 metre converter. Disposals receiver for preference such as Command, BC342 desirable. A.c. power supply essential. Roth Jones, 1 Albert Road, Melbourne, Vic., 3004. Telephone 26-5811.

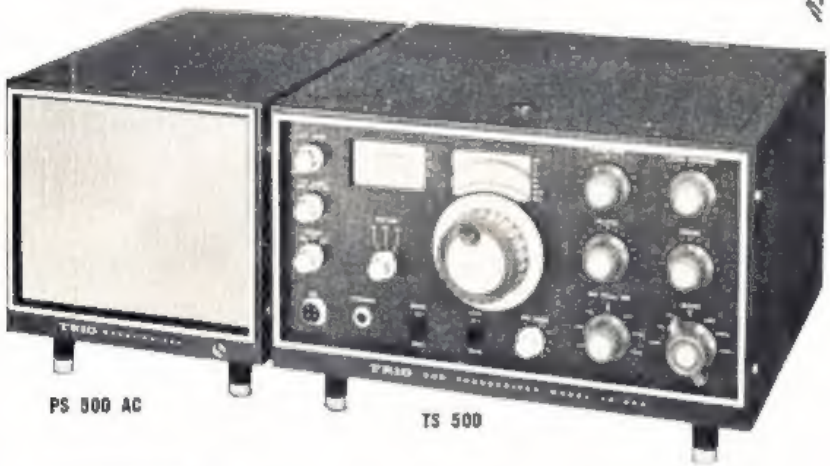
WANTED TO BUY: Trio JR500SE. Sell Lafayette 230 $60. Knight, Tel. 93-6909 (Melb.)



TRIO

SSB transceiver

200 watts PEP—7 Bands—A M & C W
and
Power Supply and Speaker Unit



PS 500 AC

TS 500

SPECIFICATIONS:

Frequency:	80m Band	3.5-4.0 MHz
	40m Band	7.0-7.5 MHz
	20m Band	14.0-14.6 MHz
	15m Band	21.0-21.6 MHz
	10m A Band	28.0-28.6 MHz
	10m B Band	28.5-29.1 MHz
	10m C Band	29.1-29.7 MHz
Communication Method:		SSB (A3j) AM (A 3H) CW (A1)
Maximum Input Power: (Xmitter final stage)		200W (PEP)
Standard Input Power: (Xmitter final stage) 180W (PEP) 120W on 28 MHz band only		
Antenna Input Impedance:		50-75 ohm
Carrier Suppression Ratio:		More than 40 dB
Single Side Band Ratio:		More than 40 dB
Mic. Input Impedance: (dynamic or crystal mic. recommended)		High impedance

Xmitter Audio Frequency Characteristics:	300-3,000 Hz (-6 dB)
Receiver Sensitivity:	1μV S/N 10 dB (14 MHz)
Receiver Selectivity:	2.7 kHz (-6 dB) 5.0 kHz (-55 dB)
Spurious Rejection Ratio:	More than 45 dB
Image Ratio:	More than 60 dB
Undistorted Power Output:	More than 1W
Receiver Output Impedance:	SP 500 ohm PHONE 8 ohm
Power Consumption (using PS-500AC):	450W (At maximum power output) 250W (Receiving Mode)
Tubes and Transistors used:	17 TUBES, 3 TRANSISTORS, 15 DIODES
Dimensions:	W: 13⅛"; H: 8⅝"; D: 11⅜"
Weight:	17.6 lb

FOR/FOA SYDNEY: TS 500, $491.00; PS 500 AC, $98.00

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2 METRE TRANSCEIVER

- Triple conversion receiver with crystal locked 2nd and 3rd oscillators for maximum selectivity and sensitivity.
- Separate VFO tuning for both receiver and transmitter.
- Nuvistor RF amplifier.
- Provision for crystal locking of the transmitter.
- 12 volts DC (internal transistor power supply) and 230/240 volts AC operation.
- Noise limiter and squelch.
- 17 tubes, 4 transistors and 7 diodes.
- 1 microvolt sensitivity for 10 db. S/N ratio at 146 Mc.
- "S" meter, RF output meter, and "netting" control.

Price: $282.00

MILLER 8903B PRE-WIRED I.F. STRIPS

455 Kc. centre frequency, 55 db. gain, uses two PNP transistors and diode detector. Bandwidth 5 Kc. at 6 db. DC requirements: 6 volts at 2 mA.

Price: $9.70

Plus pack and post 25 cents

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ATS25 ceramic base 807, **70c** or **three for $2.**
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6CQ6, **20c** or **6 for $1.**
VR150/30, **75c** or **3 for $2.**
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6H6 metal, **20c** each.
DM71 indicator tube, **40c ea.** or **6 for $2.**
6F33, **30c** ea.

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Mixed Values
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plus postage 20 cents

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TRANSMITTER

SSB — AM — CW
80 Metres to 10 Metres

- Ultra-precision three-stage double gear tuning mechanism, completely free of backlash, spreads each 600 Kc. over 1.68 metres with 1 Kc. dial calibrations.
- Stability better than 100 cycles. "Vackar" type VFO. Voltage regulated power supply.
- Uses mechanical filter at 455 Kc. specially designed for SSB. Selectable upper or lower sideband. Carrier and sideband suppression 50 db. or more.
- May be connected with STAR SR-700A receiver for transceive operation.
- Fully adjustable VOX and ANTITRIP circuits for automatic transmission/reception.
- Press-to-talk relay, break-in keying and sidetone oscillator for CW monitoring.
- Automatic level control circuit assures high quality distortion free SSB.
- Built-in antenna relay.
- Final stage uses two 6146s in parallel with conservatively rated input of 250 watts PEP on SSB and CW, 100 watts on AM.
- Built-in heavy duty power supply with adequate reserve margin assures trouble-free operation.
- Power supply 220 to 240 volts AC 50 cycles.

Price: $519.50

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STAR SR-700A
RECEIVER

SSB — AM — CW

- Ultra-precision three-stage double gear tuning mechanism, completely free of backlash, spreads each 600 Kc. over 1.68 metres with 1 Kc. dial calibration.
- Stability better than 100 cycles. "Vackar" type VFO. Voltage regulated power supply.
- Triple conversion. IF's 1650 Kc. and 55 Kc. First and third oscillators crystal controlled.
- Imagine ratio better than 60 db. on all bands. Beat interference below noise level.
- Variable selectivity band pass filter at 55 Kc. provides steep cut offs and a good shape factor. Four positions: 0.5, 1.2, 2.5 and 4 Kc. (at 6 db. down).
- T-notch filter provides better than 50 db. attenuation.
- Variable decay AGC. Variable BFO tuning.
- Output terminal on VFO for transceive operation.
- Product detector for SSB/CW. Diode detector for AM.
- Noise limiter with adjustable clipping level operates on AM, SSB and CW.
- Built-in 100 Kc. crystal calibrator (crystal included). Zero adjustment on VFO.
- Sensitivity better than 0.5 uV. for 10 db. S + N ratio on SSB and CW, better than 1 uV. on AM.
- Power output, 1 watt. Impedance, 4 ohms.
- 13 tubes, 6 diodes.

Price: $461.50

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Price: $120

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1 Mc. to 150 Mc., also doubles as a Field Strength Meter
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